London School of Economics and Political Science

Assessing the sustainability of pension reforms in Europe

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A thesis submitted to the Department of Social Policy of the London School of Economics for the degree of Doctor of Philosophy, London, March 2010

Declaration of authorship

I certify that the thesis I have presented for examination for the MPhil/PhD degree of the London School of Economics and Political Science is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it).

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Abstract

Spurred by the ageing transition, many governments have made wide-ranging reforms, dramatically changing Europe's pensions landscape. Nevertheless there remain concerns about future costs, while unease about adequacy is growing. This study develops a comprehensive framework to assess pension system sustainability. It captures the effects of reforms on the ability of systems to alleviate poverty and maintain living standards, while setting out how reforms change future costs and relative entitlements for different generations.

This framework differs from others, which just look at generosity at the point of retirement, as it uses pension wealth - the value of all transfers during retirement. This captures the impact of both longevity and changes in the value of pensions during retirement. Moreover, rather than focusing only on average earners with full careers, this framework examines individuals at different wage levels, taking account of actual labour market participation. The countries analysed cover 70% of the EU's population and include examples of all system types.

Our estimates indicate that while reforms have decreased generosity significantly, in most, but not all, countries the poverty alleviation function remains strong, particularly where minimum pensions have improved. However, moves to link benefits to contributions have made some systems less progressive, raising adequacy concerns for women and those on low incomes. The consumption smoothing function of state pensions has declined noticeably, suggesting the need for longer working lives or additional private saving for individuals to maintain pre-reform living standards. Despite the reforms, the size of entitlements of future generations should remain similar to that of current generations, in most cases, as the effect of lower annual benefits should be offset by longer retirement. Though reforms have helped address the financial challenge faced by pension systems, in many countries pressures remain strong and further reforms are likely.

Acknowledgements

While conducting this research, I was employed as an Economic Advisor in the Pensions Analysis and Incomes Division of the Department of Work and Pensions. I owe a debt of thanks to my managers and colleagues there, particularly Chris Kent, Malcolm Nicholls, Adrian Richards and Ivan Mathers, for the support they provided during this period. Similarly I am in debt to the Centre for Analysis of Social Exclusion for providing accommodation and computing facilities and to the LSE Department of Social Policy for academic guidance.

The simulation model APEX, used from Chapter 5 onwards, was kindly provided by the Directorate for Employment, Labour and Social Affairs of the Organisation for Economic Co-operation and Development. I am particularly indebted to my friends in Paris, Edward Whitehouse and Monika Queisser, for their kind help, advice and support. Without their seminal work it would not have been possible to survey so many different European countries.

Chapter 3 draws on work I conducted for the European Centre for Social Welfare Policy and Research in 2006. I would like to acknowledge the inspiration and encouragement provided by Asghar Zaidi, who convinced me to embark on my doctoral research, despite my initial wariness.

Likewise I would like to thank Alfred Demarco at the Central Bank of Malta for the continued encouragement and support he provided during my studies.

I have received support and assistance from colleagues, family and friends too numerous to mention. Pride of place goes to my family, particularly my mother Georgina and my father Francis, back in Malta where I used to retire for long periods to work on drafts of this work. Without their help, this research would never have seen the light of day. Similarly, I am very grateful to my girlfriend, Emily, for her constant help and inspiration during the last months before I submitted this work.

I owe a great academic debt to my associate supervisor, Nick Barr, whose research inspired a lot of my thinking on pension reform and fuelled my interest in the subject back in my undergraduate days in the late 1990s.

Finally, I would like to thank my principal supervisor John Hills for his ideas, criticism, constant attention, discipline and enthusiasm during these four years. Many times I thought I was quite an unnecessary distraction for John – who during these years managed to produce several excellent reviews on various important topics (such as social housing and inequality) for the UK Government. However, he always impressed me with his continued interest and commitment to my research. I hope other future LSE researchers in social policy and economics will have the great advantage of working with a model supervisor like him.

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Introduction

> Systems providing financial security for the old are under increasing strain throughout the world. Rapid demographic transitions caused by rising life expectancy and declining fertility mean that the proportion of old people in the general population is growing rapidly. Extended families and other traditional ways of supporting the old are weakening. Meanwhile, formal systems, such as government-backed pensions, have proved both unsustainable and very difficult to reform. In some developing countries, these systems are nearing collapse. In others, governments preparing to establish formal systems risk repeating expensive mistakes. The result is a looming old age crisis that threatens not only the old but also their children and grandchildren, who must shoulder, directly or indirectly, much of the increasingly heavy burden of providing for the aged.
>
> *Averting the old age crisis, World Bank 1994*

> Europe has started to prepare for these challenges, and encouraging progress has been made by some Member States…. However, without further institutional and policy changes, demographic trends are expected to transform our societies considerably, impinging on intergenerational solidarity and creating new demands on future generations. Such trends will have a significant impact on potential growth and lead to strong pressures to increase public spending…..Recent analysis confirms that there is a window of opportunity – a period of about ten years during which labour forces will continue to increase – for implementing the structural reforms needed by ageing societies. Taking no action would weaken the EU's ability to meet the future needs of an ageing population.
>
> *European Commission communication to the European Parliament and Council 2009*

> The stabilisation of public pension spending can be attained also by means of reducing future generosity of pension benefits….The decline in the public pension benefit ratio over the period 2008 to 2060 is substantial, 20% or more in 11 Member States….It is very difficult to assess to what extent future pension benefits will be 'adequate' in the future…The risk of a 'too small' pension must not be overstated by focusing on the drop in the benefit ratio…
>
> *Economic Policy Committee and European Commission, 2009 Ageing Report*

These quotations illustrate what is possibly the biggest social policy issue faced by governments across Europe. Having set up an intergenerational social contract through which workers finance significant transfers to the elderly on the assumption that future workers will do the same, policymakers have in recent decades increasingly worried about the system's sustainability. Spurred by the ageing transition, many governments have carried out wide-ranging reforms in their pension systems. The public pensions landscape in Europe has consequently changed dramatically since the early 1990s. Nevertheless concerns about future costs remain at the top of the agenda of most EU finance ministers. Yet, public resistance to reforms remains strong, with strikes, demonstrations and increasingly cases of reform reversals or modifications, reflecting concerns about the social impact of the reforms. In this light, it is evident that policymakers need to develop a comprehensive framework with which

to assess the sustainability of their pension systems. They need to have a framework which looks at financial sustainability and intergenerational equity but which also gives due weight to the impact of reforms on the achievements of their pension systems. As suggested by the quotations above, policymakers seem unsure of how to quantify and weigh against each other the different risks reforms face.

While projections of the economic impact of ageing and concerns about intergenerational equity point towards the need to reform, there are growing concerns that policymakers may have unduly focused on reducing projected spending on pensions without looking adequately at how reforms could affect the ability of systems to fulfil their roles of poverty alleviation and income replacement during retirement. Moreover, in some cases, future generations of retirees will start shouldering risks, such as longevity, that had previously been shouldered by the state. This could lower significantly the living standards of future generations, unless individuals accommodate the change in generosity through working longer and/or saving more.

Given the growing size of the pensioner population, one could argue that if the pension system does not fulfil public expectations, and/or older people find that they did not make appropriate saving and working decisions, the state could be forced by voters to reverse reforms and spend more on social transfers. Rather than focusing on the effect of reforms on projected spending on pensions, assessments of reforms should also attempt to understand the implications of reforms on pension adequacy, particularly on entitlements of those population groups less able to accommodate the effects of benefit cuts through behavioural changes. The long-term sustainability of recent pension reforms depends crucially on their impact on the pension system's ability to reduce poverty and replace pre-retirement income and also on the ability of individuals to change their work and saving behaviour to accommodate the effects of reforms.

The main research question of this dissertation will therefore be:

- Are the pension reforms enacted in Europe during the last decade sustainable?

This dissertation will attempt to re-evaluate recent pension reforms in Europe in the broad perspective described above. The research will be divided in three parts. The first part (Chapters 1 to 3) will review the current importance of pensions in reducing poverty among elderly people and in replacing pre-retirement income, describe the reforms which have been occurring and outline the existing literature evaluating these reforms. The second part (Chapters 4 to 7) will develop a broader evaluation framework using (and refining on) models and indicators of pension entitlements developed by the OECD and the Indicators Sub-Group

of the EU's Social Protection Committee. It will also provide a preliminary assessment of the social sustainability of pension reforms, by looking at how the outcomes of pension systems might change by 2050 and assess to what extent this differs from what the situation would have been like under unchanged systems. The third part (Chapters 8 and 9) will further develop this assessment by refining the modelling, so to reveal better where pressures for further reform might arise and investigate the required changes in saving and working longer for individuals to maintain the living standards of current generations of pensioners, despite reductions in pension system generosity.

This research's main theoretical contribution will be to delineate a broader concept of sustainability. Using this definition, reforms will be assessed in view of their impact on the ability of the pension system to achieve its set objectives, and the behavioural changes they necessitate in individuals to accommodate changes. This is inspired by the recognition that 'inadequate' pensions pose risks to sustainability, and carry with them the danger of ad-hoc policy reversal. This research will argue that policymakers should focus on 'social sustainability' - a long-term solution through which the aims of the system continue to be achieved without putting excessive pressure on system constraints. In this sense, an effective reform would result in the system being financially sustainable and still able to achieve its set objectives, and capable of adjusting to shocks in longevity, financial markets and the economy.

In terms of pension system adequacy there appear to be four concerns. From a political economy perspective, the adequacy of the system for the average voter needs to be ensured. If a system is not seen as beneficial by the electoral majority, namely by not helping them maintain their pre-retirement living standards, it could be voted out. Similarly if a system is not seen as able to alleviate poverty, the political pressures that led to the setting up of social assistance to elderly people during the early part of the twentieth century might re-emerge. Policymakers appear to be well aware of the need to ensure that future generations of workers do not end up having to pay very high contribution rates in order to finance pension transfers. A less discussed issue is the need of adjacent generations to enjoy similar living standards. If a young generation finds that a previous generation had a much better pension deal, it might want to renege on this arrangement.

Thus from a theoretical perspective this dissertation will try to answer two questions:

I) Can one develop a concept of sustainability encompassing pension system adequacy within a context of fiscal sustainability?

II) Which are the best measures for judging pension system adequacy?

From an empirical perspective, the dissertation will assess across a range of European countries:

I) What is the current importance of state pensions in supporting living standards? How do reforms impact on generosity and system design?

II) Are the changes socially sustainable and what changes are required in saving and working longer for individuals to maintain living standards?

This study will take a broader look at pension reform, beyond public finance implications of changes. To do this, we first assess how effective state pensions currently are in supporting the living standards of elderly people (Chapter 1). Then we try to understand whether there are major differences in what European pension systems are delivering (Chapter 2). This analysis will be done using data from surveys on living conditions/incomes, mainly the European Union Statistics on Income and Living Conditions (EU-SILC) compiled by the EU's statistical agency, Eurostat.

After gauging the current importance of state pensions, the next stage is to determine how recent pension reforms impact on individuals. Although there have been several studies on reforms in particular countries, to date there have been very few attempts to come up with a synthetic analysis of the overall change in the European pension landscape. Information on specific pension reforms will be sought from existing literature, while details on the current and past parameters will be ascertained from exercises such as the EU's Mutual Information System on Social Protection (MISSOC) Comparative Tables. This synthesis of European reforms and the causes leading to them will be set out in Chapter 3.

This will reveal how reforms have been driven mostly by a rather limited concept of sustainability conceived as reducing projected levels of future spending on state pensions, through cuts in generosity. Chapter 4 will develop the broader concept of social sustainability, incorporating both pension system adequacy and financial sustainability. Once this is defined, in Chapter 5 a framework of indicators will be set out which could be used to measure the extent to which reforms could achieve social sustainability. This will build on and improve on existing indicators, such as theoretical replacement ratios - abstract measures of pension generosity based on the modelling of the benefits accruing to a stylised individual. These indicators will be developed using the OECD's APEX cross-country pension entitlement model.

At present, most studies on adequacy deal simply with theoretical replacement rates at the point of retirement. However, this approach does not seem appropriate in light of the

continued increase in longevity. An individual in future might be getting a pension which provides a lower replacement rate in any one year than under current rules, but still get the same amount of total transfers over the whole lifetime. This is particularly true in case of systemic reforms which are built on the notion that annual benefits are changed automatically with demographic developments. In this regard, to assess the effective impact of reforms, one needs to look at more sophisticated indicators of generosity, such as pension wealth – the value of all the prospective pension transfers received by an individual. Using pension wealth, one can also determine the overall liabilities faced by governments, thus providing a direct link between an adequacy and a fiscal sustainability indicator. At the same time, pension wealth presents a better measure of pension adequacy as it takes into account changes in indexation and in the length of retirement, and captures the overall generosity of a pension system – rather than the generosity at the time of retirement. It also captures the effects on entitlements of changes in the age of retirement. These new indicators will be presented in Chapter 6, where the current achievement of system objectives and the pressure on system constraints will be compared with the projected outcomes of the reformed systems in 2050. Chapter 7 will, on the other hand, present how these indicators would have developed had no pension reforms taken place.

The third and final stage of the dissertation will focus on measuring better the social sustainability of reforms. Assessments of pension system adequacy have primarily concentrated on men with a full contribution record of full-time employment, earning the mean wage. Besides this group being relatively small, this approach ignores the fact that adequacy is best studied by looking at the effects of reforms on those most at risk – namely those with broken careers and on low incomes. This is particularly important because in many countries reforms have sought to tighten the link between contributions and benefits. Thus in Chapter 8, the research moves away from the standard full-career hypothesis and instead looks at a scenario more consistent with the actual labour market participation observed in these countries, including part-time employment and minimum pension provision. This will enable an assessment of the effective impact that reforms will have on pensioner poverty and the degree of consumption smoothing over lifetimes. This will then be used to estimate the additional saving individuals would need to make to accommodate the changes in state pensions. Chapter 9 will further develop this theme, by looking at the impact of labour market participation on the sustainability indicators. This will show that if governments want to reach a long-term solution to the challenge of ageing societies, they cannot stop at pension reform but must adopt policies that ensure that individual economic behaviour is modified to

accommodate changes in state provision. Finally, Chapter 9 will further refine the indicators by trying to adjust for contribution credits awarded to the unemployed or to those with caring responsibilities, and by looking at the impact of socio-economic differences in labour market participation and longevity. It will also assess the sensitivity of pension systems to shocks in longevity improvement, wage and GDP growth, interest rates and employment.

Throughout, the research adopts a clear policy focus, trying to show how the social sustainability framework could be best applied by policymakers. This framework helps to understand the mix of policy choices faced by governments; namely the extent to which benefits can be allowed to decline, state liabilities to rise, working lives extended, and private saving increased, in order to achieve a sustainable pension system. By looking at sustainability beyond the standard fiscal definition, the research will indicate areas where governments need to do more to ensure a smooth transition. The study will shed light on the best practice among reformers and set out starkly the implications of reforms. It will contribute to the existing literature by putting into perspective the substantial changes in pension provision that have taken place across Europe, assess what preliminary lessons can be learnt from the experience of particular countries, and explore possible ways that governments could use indicators better to ensure sustainability of reforms. Sustainability is only achievable through a new understanding between the state and individuals which creates the conditions for the maintenance of adequate living standards during retirement. Simply legislating away previous pension commitments is unlikely to result in a lasting social adjustment to the ageing process.

PART ONE

THE CURRENT IMPORTANCE OF STATE PENSIONS ACROSS EU COUNTRIES AND A REVIEW OF RECENT REFORMS

1. The role of state pensions in the income of elderly people across European countries

The starting point of this study will be to ascertain the effective importance of state pension transfers for elderly people[1] in Europe. In this way, it will be possible to determine better the impact pension reforms might have on individuals in different countries. This chapter will introduce some of the indicators which will be used throughout this study to evaluate the outcomes of pension systems. Even very generous pension systems can leave high levels of poverty, if they do not have high coverage or system rules work against particular groups such as women.[2] Therefore to understand better the possible impact of reforms, it is essential to be able to gauge how current systems feed into retirement income conditions. This chapter is in two parts: the first outlining the relative role of pension systems and the second looking at some of the existing literature on the income of elderly people, supplemented by some secondary analysis of data from cross-country surveys on living conditions/incomes, mainly the European Union Statistics on Income and Living Conditions (EU-SILC).

1.1 The role of pension systems

Pension plans have a long history,[3] but became more common in the wake of industrialisation and urbanisation. Holzmann & Hinz (2005) portray the rise of modern pension systems as a reaction to the socioeconomic changes of the nineteenth century, noting that "as individuals moved out of the traditional agricultural family structure, there was a need to establish formal risk management arrangements that could substitute for the informal arrangements that were eroding in the face of the transition".[4] State income-transfer programmes to elderly people can be traced to the late nineteenth century, first in Germany and Denmark. The reasons why pensions were established in these two countries appear to have differed significantly. In Germany, Chancellor Bismarck was interested in "tying workers' interests to the new German state",[5] while the Danish scheme was introduced as a locally administered means-tested scheme for needy citizens over age 60. This distinction reflects two distinctly different aims –

[1] The term "elderly people" refers to those aged above 65, even when this is not the state pension age. The reason for this is that data for some indicators are only available at this age.
[2] For instance, Portugal has one of the highest at-risk-of-poverty rates in the EU, even though the net replacement rate of its pension system is among the highest.
[3] In the UK the first pension scheme for Royal Navy officers was set up in the 1670s (see BBC (2002)).
[4] Caucutt et al (2007) also explains the emergence of social security in the US in terms of the population shift from rural to urban areas. This migration is deemed to have led to political support for social security as individuals could no longer rely on land as a source of old-age income.
[5] See Palacios & Sluchynsky (2006).

in the German case: a need for income stability over the life-course, and in the Danish case: a need to alleviate poverty during old age. These two aims have characterised state pension systems throughout the decades, and while some systems remain in policy rhetoric focused on one particular aim, nowadays, most pension systems serve both purposes.

Barr & Diamond (2006) argue that "from an individual viewpoint, income security in old age requires two types of instruments: a mechanism for consumption smoothing, and a means of insurance".[6] The first purpose involves the transfer of consumption from productive middle years to retired years, allowing the individual to choose the preferred time path of consumption over working and retired life. Due to the substantial uncertainties faced by individuals, primary among them guessing correctly their life expectancy and their resource needs during retirement, and market failures, this consumption smoothing requires insurance, which has tended to be organised centrally either by employers or the state. Barr & Diamond (2006) further contend that "a second reason for government involvement is that public policy generally has objectives additional to improving consumption smoothing and insurance, notably poverty relief and redistribution". Thus pensions serve as a means to target resources on people who are poor on a lifetime basis and also redistribute incomes on a lifetime basis (subsidising the consumption smoothing of low-income individuals). Pension systems can, moreover, be used to redistribute across generations.

To understand the role of pensions fully, one needs to consider that besides these primary objectives, policymakers usually have secondary goals mostly relating to the effect of pensions on labour and capital markets. Thus if a particular system, in order to achieve its primary goals, results in too high tax rates, it could adversely affect employment rates. A pension system that provides very generous levels of benefits may also displace private saving and thus result in smaller capital markets. These and similar arguments tend to be taken under consideration particularly when decisions are made on pension system design.

The main constraint on pension systems – like other areas of government spending – is the financial resources allocated for this purpose. From the very beginning, this factor played an important role in shaping pension policy. It is noteworthy that in most countries, when pensions were established governments established specific taxes or contributions to finance them. These concerns persisted over time, and pension systems in some countries (such as the UK, Netherlands and Australia) took a relatively long time to move beyond the poverty alleviation role or tended to involve private sector employers in income replacement. Pre-

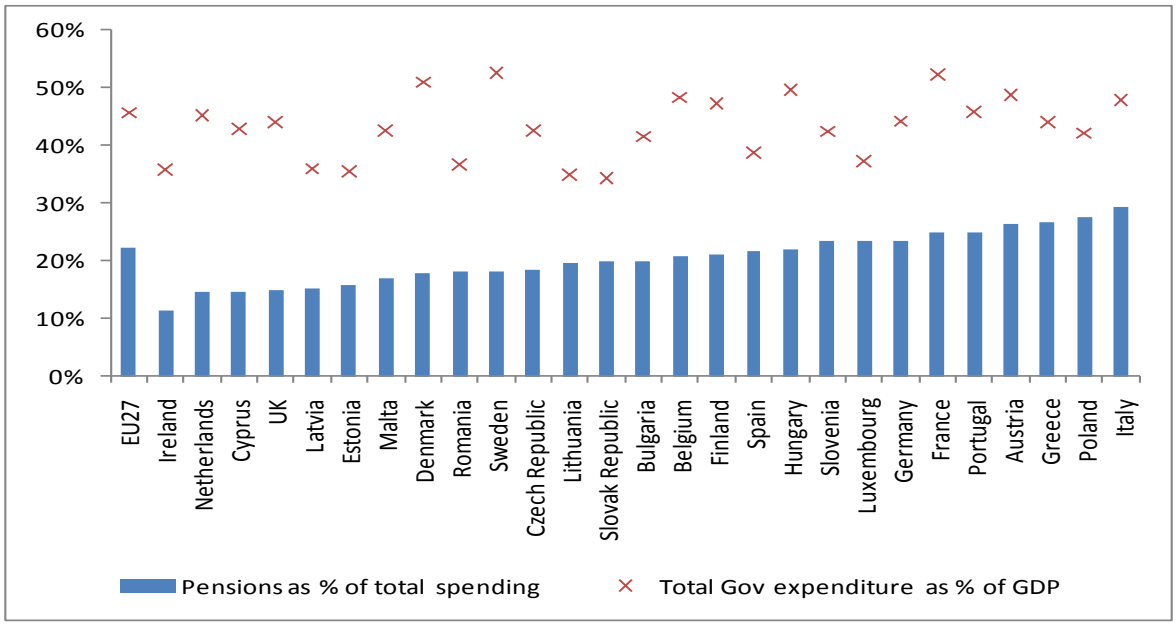
[6] Whitehouse (2007) makes the same argument and, in fact, classifies the pension schemes of different countries on the basis of these two functions.

funding of pension promises also tended to be common and in some British ex-colonies, such as Singapore and Malaysia, has survived to this day.

1.11 The importance of pension outlays

In most developed countries, pensions are the single largest item of government spending. Figure 1.1 shows that across the EU, state pension spending constitutes more than a fifth of total government outlays, equivalent to over a tenth of national output. There is considerable variation, with the proportion of public spending in Ireland being nearly a third that in Italy, but in all countries pensions feature prominently. Moreover the Figure suggests that the expansion of state pensions does not solely reflect the expansion of state activity. State pension spending is high in countries, like Denmark and Sweden, with high overall public spending, but also in countries, such as Luxembourg and Poland, with a much smaller public sector. The similarity in pension expenditure levels is even more evident when one includes spending on occupational pension schemes.[7] This suggests that there are fundamental determinants of the presence of collectively organised pension systems which have tended to lead to the decommodification of this particular economic activity in most of Europe.

Figure 1.1: Government spending and the share of state pensions (2007)

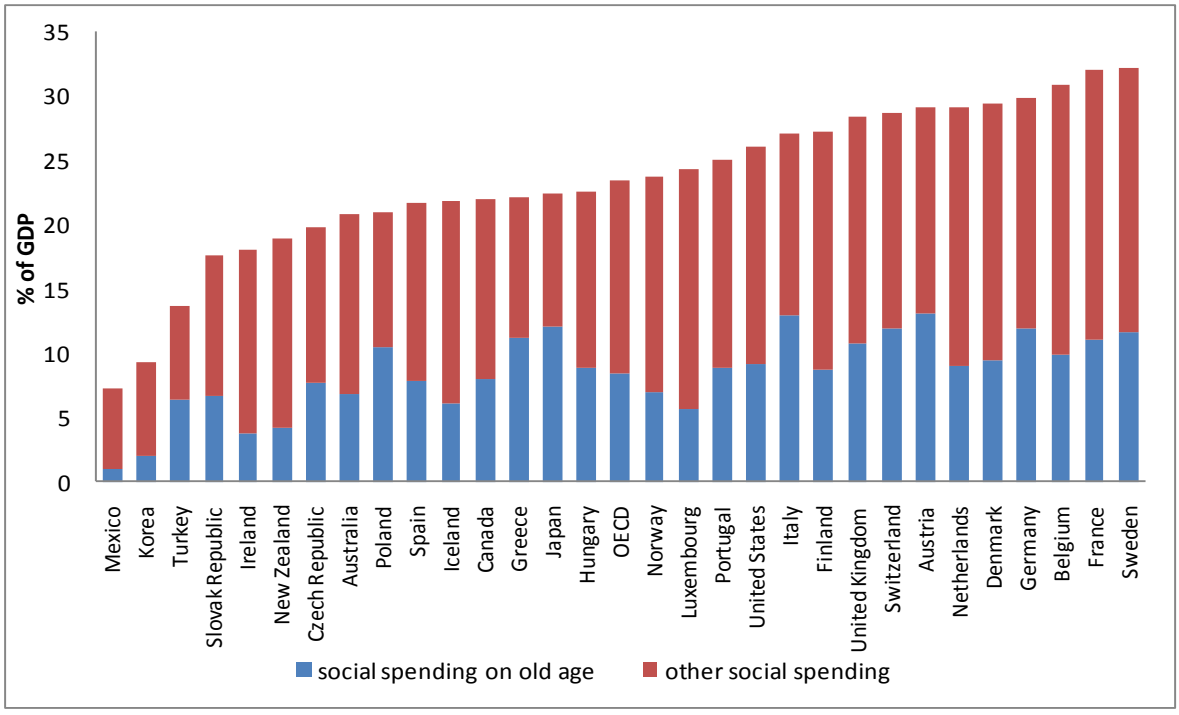


Note: Countries arranged in order of the share pension spending has of total state spending.
Source: Eurostat and Economic Policy Committee (2009).

[7] For instance, data from Eurostat's European System of Integrated Social Protection Statistics (ESSPROS) confirm that in the UK and the Netherlands, where provision has traditionally been allocated partially to employers, overall spending is comparable to that in countries with state-only provision.

The OECD Social Expenditure Database (SOCX)[8] has comparative data on social spending, which cover estimates of voluntary private provision and include some major non-EU countries. Figure 1.2 shows that most EU countries devote more of their GDP on social spending, on average, than the OECD average. Richer countries tend to have higher social spending. However the size of social spending does not exactly match the country's ranking in terms of GDP per capita. For instance, Ireland is the fifth-lowest spender on social services despite having a GDP per capita that is 38% higher than the OECD average.[9] Conversely, Sweden spends much more on social services than its relative GDP per capita would imply. Looking at the composition of overall social spending, expenditure on pensions tends to consume more than a third of total outlays on average in OECD countries. There are very strong variations across EU countries, with pension spending taking up around a half of all social spending in Greece and Italy, but only a fifth in Ireland.[10]

Figure 1.2: OECD estimates of total social spending and spending on old age (2005)*

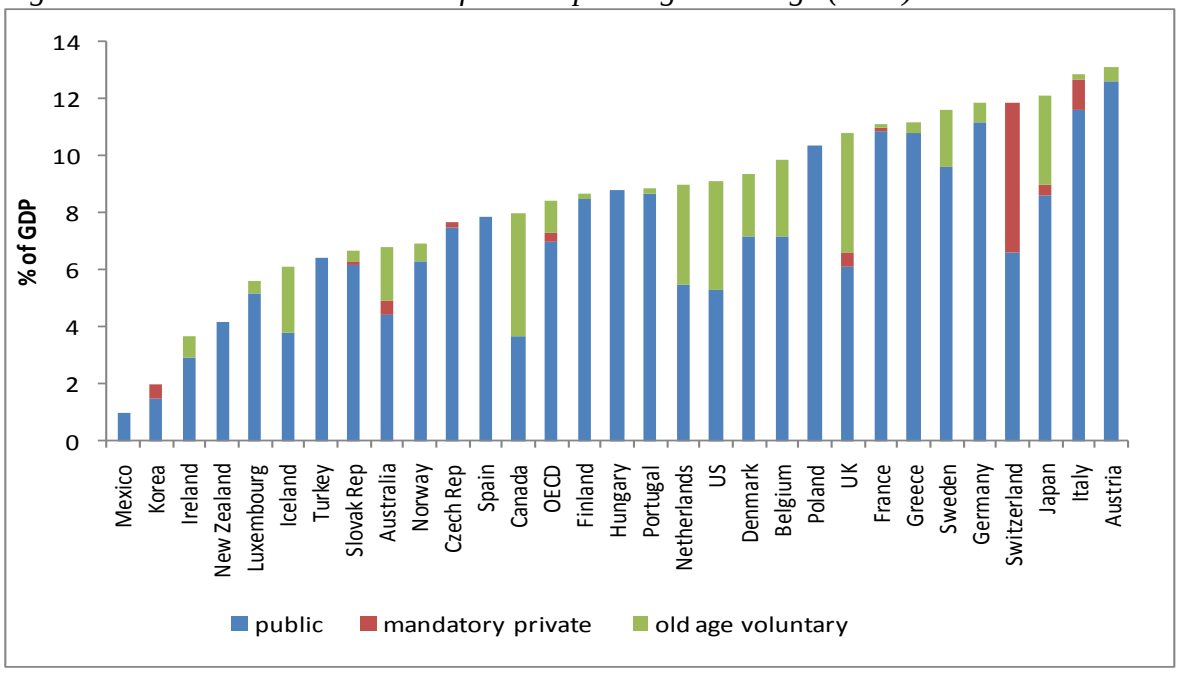


Note: Order of countries according to the size of their social spending.
** The OECD defines social spending as "the provision by public and private institutions of benefits to, and financial contributions targeted at, households and individuals in order to provide support during circumstances which adversely affect their welfare, provided that the provision of the benefits and financial contributions constitutes neither a direct payment for a particular good or service nor an individual contract or transfer".*
Source: OECD SOCX (2008).

[8] See Adema & Ladaique (2005). Individual pension arrangements are included if they are tax-advantaged.
[9] Ireland has been moving up the table. In 2001 it was the third-lowest spender.
[10] However the OECD express concern on the pension data comprehensiveness for Ireland.

The OECD data, depicted in Figure 1.3, also show that public spending makes up the bulk of pension outlays. In most EU countries, the scale of private spending is small, except in the UK and the Netherlands. Voluntary private provision is on the rise, however. It is interesting to note that having higher state spending on pensions does not preclude also having a significant private pension component. For example, Belgium spends much more than the Netherlands on state pensions, and yet its private pension sector compares well with the Dutch one. Nevertheless, countries with the highest levels of spending tend to do this mostly through state provision.

Figure 1.3: Public-Private shares of social spending on old age (2005)



Note: Countries arranged in order of the size of pension spending.
Source: OECD SOCX (2008).

1.12: Why is there so much public provision?

Prior to embarking on an analysis of the influence of state pensions, it is worthwhile to set out briefly some of the causes behind the importance of these transfers.

In standard neoclassical economic theory, individuals are capable of planning for old age provision. The perfectly rational and forward-looking individual would smooth consumption throughout the life-course, seeking employment until marginal productivity is higher than marginal disutility of working (i.e. preference for leisure). While in employment, the individual would save part of income in order to provide for outlays during retirement (and to repay the expenditure conducted when young) and insure against longevity risk. One can

modify this individualistic framework by introducing interaction between different generations, through channels such as care and bequests. Given this framework, financial markets should be able to provide efficient individual pension provision with no role for the state (other than for redistribution – both intragenerational and intergenerational) or employers (other than for the purposes of motivating or retaining staff). Nevertheless in most countries pension provision is collectively organised.

Jousten (2007) presents an excellent outline of the main reasons for this. First of all, like all insurance contracts, pensions are affected by adverse selection. Heterogeneous individuals can behave strategically and misguide pension providers by hiding their true characteristics. Those with better life expectancy prospects, for instance, are more likely to seek to enter into annuity contracts. Cocco & Lopes (2004) use data from the UK's Family Resources Survey to study individual pension choice between defined contribution (DC) and defined benefit (DB) plans, relating it to labour income characteristics. They find that "individuals who face income growth are more likely to choose DB final salary plans, and less likely to choose the DC plan" while "individuals who face higher earnings volatility are less likely to choose DB final salary plans". They also find that "individuals with shorter job tenures are more likely to contribute to the DB state plan or to DC plans instead of occupational plans". Self selection may result in suboptimal economic outcomes as providers may react by providing incomplete coverage for some groups.[11] Compulsory coverage remedies this but individuals are forced to participate at average annuity rates rather than risk-group specific rates.[12] Nevertheless economic literature, such as Eckstein et al (1985), indicates that there is welfare improving potential for a compulsory pension scheme.

The second major reason for public intervention is the presence of moral hazard. This arises when individuals are able to take actions that are detrimental to the other party. So if individuals know that society does not allow destitution or poverty, by providing minimum income guarantees, they may be tempted not to provide for themselves. This would result in significant financial difficulties for public finances. By forcing everyone to provide for older age consumption requirements, government reduces this problem and is thus able to enact a poverty prevention strategy – the so-called pillar zero in World Bank terminology[13] – without

[11] The UK private pension market is definitely characterised by under provision for certain groups, so much so that government has tried to remedy this by reforms like stakeholder pensions and auto-enrolment.
[12] This may, for instance, disproportionately affect low-income individuals who tend to have shorter life spans than high income earners.
[13] See Holzmann & Hinz (2005) for the latest version of the World Bank's multi-pillar pension framework.

substantial negative incentive effects. Having a standard retirement age for all is also, in part, justified in this light – as otherwise individuals may retire earlier than is economically optimal.

A related issue, though not driven by self-serving strategic individual behaviour, is the presence of myopia, or similarly the lack of perfect information. The classical example of myopia is when people over-consume in the short run as they do not attach an adequate value to their future consumption needs. Behavioural economics presents many cases which depart from the rational individual of neoclassical models. One such empirical case is hyperbolic discounting, where instead of the constant discount rate assumption of neoclassical models, individuals are found to have discount rates which increase as the time before payoffs grows shorter.[14] More simply, since people seem to prefer smaller payoffs now rather than bigger ones in the future, a paternalistic government would intervene ex-ante in order to prevent sub-optimal behaviour like under-saving and excessive early retirement. By setting pension levels well in advance, governments also ensure consumption is smoothed adequately.

On a more technical side, it is increasingly understood that administrative and management costs crucially determine the eventual pension streams of individuals. While individual choice in most markets adds to social welfare, in pensions the benefits are less obvious, especially given the low financial education levels usually encountered amongst the population of even highly developed economies. A decentralised system increases costs both on an administrative level, and also on a decision-making level.[15] Moreover operators have to spend resources to attract participants, and also to compete with each other for customers. Setting up a compulsory centralised pension saving scheme reduces these deadweight losses. On an empirical level, it also appears that consumers do not want to be faced by a lot of decisions. For instance, in the Swedish personal accounts system the large amount of investment choices is leading an increasing proportion of individuals to opt for the default fund, from one-third in 2000 to 92% in 2005.[16] Furthermore from a social welfare perspective, one needs to take into account that fixed costs fall more heavily on those with small accounts. Frericks (2007) also argues that private schemes based on a purely contributory principle may reduce social welfare as they do not create incentives for socially required, but unpaid, activities such as caring, housework and reproduction.

[14] Dasgupta & Maskin (2004) present several empirical cases, such as the desire of people to start saving for Christmas at the start of the year, which declines with time. Similarly individuals may want to save for retirement, but over time they might never actually do it because their discount rate changes.

[15] Sheshinski (2003) proves theoretically how expanding choice can lead to decision errors, and also how the costs of making choices may outweigh benefits, in a context of bounded rationality.

[16] Consequentially a commission appointed by the Swedish Government proposed a drop in the number of funds from over 700 to 100. See Premium Pension Commission (2005).

Finally another reason why governments (or employers) have to step in is the absence in real life of perfect capital and financial markets, and the possibility of default of financial intermediaries. As a result, it is not possible for individuals to protect themselves adequately against risks such as inflation, longevity and aggregate investment risk. By pooling all individuals, the state can provide this cover, though the extent to which it does so depends on the nature of provision. Jousten (2007) notes how DB and DC plans "translate into very different benefit structures, with fundamentally different outcomes in terms of risk". In a pure DC plan, plan participants bear both the risk of longevity and investment, while in pure DB plans, these are borne by the provider.

1.13: Objectives envisaged for pension systems

Having reviewed the empirical importance of state pensions, and outlined the theoretical justifications given for their existence, it is useful to set out the fundamental roles or objectives that international institutions envisage that pension systems should have.

In Holzmann & Hinz (2005), the World Bank sets its new approach towards pension reform, in reaction to the criticism it received in recent years. It argues that "pension systems need to provide adequate, affordable, sustainable, and robust benefits". By "adequate" the World Bank intends that "all people regardless of their level or form of economic activity have access to the capacity to remain out of extreme poverty in old age and that the system as a whole provides assurances that those individuals who live beyond the expected norms will be protected from the 'risk' of extreme longevity". The World Bank also specifies that "for a typical, full-career worker, an initial target of net-of-tax income replacement from mandatory systems is likely to be about 40% of real earnings to maintain subsistence levels of income in retirement". Lower-income workers, however, need to be provided with "somewhat higher rates".

Systems that offer replacement rates above 60% are not seen as affordable by the Bank, as they would require contribution rates higher than 20% which would be "quite detrimental" for middle- and high-income individuals (while for low-income countries 10% is seen as the upper threshold). On sustainability, Holzmann & Hinz (2005) argue that "the pension program should be structured so that the financial situation does not require unannounced future cuts in benefits, or major and unforeseen transfers from the budget". Robust systems should also be able to "sustain income-replacement targets in a predictable manner over the long-term…in the face of unforeseen conditions and circumstances". The

World Bank concludes "most existing pension systems, including some of the recently reformed systems, are unable to deliver on these promises".

The International Labour Organisation (ILO) has through the years led representatives of governments, employers and trade unions to agree on a number of conventions on pension provision. These conventions aim to "guarantee protected persons who have reached a certain age the means of a decent standard of living for the rest of their life" – which is set by Convention 238 as a replacement rate of 45%.[17] This needs to be maintained in view of changes in the cost of living subsequent to retirement. The ILO also argues that "statutory pension schemes must guarantee adequate benefit levels and ensure national solidarity" and that risks should not be borne solely by the individual but must be shared among all social agents. The coverage of systems must extend to all members of society and there should not be gender inequality in provisions. Finally the ILO agrees that "to be sustainable, the financial viability of pension systems must be guaranteed over the long-term".[18]

The EU through its Social Protection Committee has achieved agreement among Member States on common objectives on pension policy – the achievement of which is monitored through the open method of co-ordination (OMC).[19] These objectives, streamlined into three main strands under the heading: "Adequate and sustainable pensions", require that Member States ensure:

(i) "adequate retirement incomes for all and access to pensions which allow people to maintain, to a reasonable degree, their living standard after retirement, in the spirit of solidarity and fairness between and within generations";

(ii) "the financial sustainability of public and private pension schemes, bearing in mind pressures on public finances and the ageing of populations, and in the context of the three-pronged strategy for tackling the budgetary implications of ageing, notably by: supporting longer working lives and active ageing; by balancing contributions and benefits in an appropriate and socially fair manner; and by promoting the affordability and the security of funded and private schemes";

(iii) "pension systems are transparent, well adapted to the needs and aspirations of women and men and the requirements of modern societies, demographic ageing and structural change, that people receive the information they need to plan their

[17] See Humblet & Silva (2002).
[18] See ILO (2001). Gruat (1998) describes further the ILO's adequacy principles for pension reform.
[19] See Commission (2005).

retirement and that reforms are conducted on the basis of the broadest possible consensus".

Conclusions on the role of pension systems

This section has examined the role of state pension systems in European countries by looking at theoretical economic literature, comparative data on social protection expenditure and the objectives of pension systems as envisaged by international institutions in which European countries are members. The broad conclusions are that state pension systems are widely seen as essential instruments to support elderly people in maintaining their previous living standards and to prevent poverty. Harmonised data on social spending show how despite clear differences among European countries on the direct role of the state, in all countries state pension spending is the most important government outlay. Theoretical literature also suggests that this essential role for state pensions is likely to continue in the future, as state pensions serve to counter substantial market failures and constitute a significant improvement in overall welfare.

1.2 Literature on cross-national comparisons of the income of elderly people

Whereas the study of the income of elderly people started early in the development of social policy research, it was only recently that it was possible for it to be expanded to cross-national comparisons. This reflected efforts by international organisations, such as the World Bank, the OECD and the European Commission to create harmonised data sources on living conditions and incomes. The setting up of the Luxembourg Income Study (LIS) in 1983 marked a particular turning point,[20] and now this database holds data from household income surveys from 30 countries.

While EU Member States have their own incomes surveys, data may not be strictly comparable on account of different survey methodologies, coverage and definitions. Mirroring the growing involvement in social policy by the EU, its statisticians have for several years been trying to come up with an adequate data source for income and living conditions. The first major step towards cross-European comparability was the European Community Household Panel (ECHP), which has now been replaced by the EU-SILC.[21] While the ECHP was a voluntary arrangement, EU-SILC was set up by means of a Commission regulation

[20] See Smeeding et al (1985) for the first description of the aims and scope of LIS.
[21] Regulation (EU) No 1177 of the European Parliament and of the Council of 16 June 2003 concerning Community Statistics on income and living conditions.

agreed in the aftermath of the launch of the Lisbon process and the subsequent introduction of the OMC in social policy.[22] National governments, in fact, agreed in the Laeken European Council of December 2001 to endorse a first set of 18 common statistical indicators for social inclusion, to "allow monitoring in a comparable way of Member States' progress towards the agreed EU objectives".[23] Annually, EU Member States submit National Action Plans on Social Protection and Inclusion to the Commission, using harmonised data.

This section looks at three particular aspects: the sources of income for elderly people (so as to assess the importance of pension transfers by looking at micro-data rather than the aggregate spending data examined in section 1.1); the income of elderly people relative to that of the working age population (in order to understand the extent to which pensions smoothen consumption and replace former income); and the risk-of-poverty among elderly people (to evaluate the extent to which current arrangements protect this vulnerable section of European society).

1.21 The sources of income of elderly people

Having looked at the size of pension spending from a macro-perspective, it makes sense to review evidence on the sources of income of elderly people, so as to better understand the extent to which they are dependent on pensions during their retirement, and what element of this is accountable to state pensions.

Peaple (2004) notes how in the largest European countries, except for the UK, there is heavy reliance on state pensions, which are quite generous for those with full careers. Smeeding (2001) presents similar findings, where despite the fact that participation in occupational plans is quasi-mandatory (due to collective bargaining) in both Sweden and the Netherlands, the proportion of income from state pensions for an elderly person at the fifth decile of the income distribution stands at close to 90%, compared to about 65% in the UK, Canada and the US. Reliance on occupational pensions rises at higher income groups. Casey & Yamada (2001) shows that for men public pensions are by far the most important source of disposable income in Finland, Germany and Italy and, to a somewhat lesser extent, Sweden, while private pensions are important in Canada, the Netherlands and the UK. As regards women, there is a predominance of public pensions throughout all countries. Reliance on means-tested benefits is also quite strong in some countries, particularly at older ages (see

[22] For an example of how EU-SILC is applied in a Member State refer to Central Statistics Office (Ireland)'s manual at http://www.cso.ie/eusilc/documents/silc_manual_2005.doc.

[23] See Eurostat (2003) for an explanation of the calculation methodology used to compute the 'Laeken' indicators. The objectives were discussed in section 1.13.

Table 1.1). While this may be partly due to cohort effects,[24] it could also reflect indexation rules which tend to lead to a steady deterioration in relative living standards over time.

Table 1.1: Elderly people with means-tested benefits and private pensions in 1994/95

	Age	**% with means-tested benefits**	**% with private pensions**
Canada	60-64	18	39
	65-69	16	59
	70-74	19	57
	75+	29	48
Germany	60-64	10	12
	65-69	7	16
	70-74	..	17
	75+	..	11
Netherlands	60-64	12	55
	65-69	..	74
	70-74	..	77
	75+	13	66
Sweden	60-64	10	59
	65-69	16	89
	70-74	25	83
	75+	42	71
UK	60-64	20	63
	65-69	17	79
	70-74	27	73
	75+	38	61
US	60-64	12	39
	65-69	11	49
	70-74	11	51
	75+	11	43

Source: Casey & Yamada (2001).

Zaidi et al (2006) present data on the income composition of two adjacent ten-year cohorts, that immediately prior to 65 and that immediately following, which show that upon reaching 65, dependence on old age benefits rises substantially. However, as Table 1.2 suggests, there are marked differences in this transition, as in some countries, such as Italy, France and Greece, dependence on old-age benefits is already high among those aged 55 to 64.

[24] Older cohorts are significantly poorer than younger ones, and had less access to private pensions.

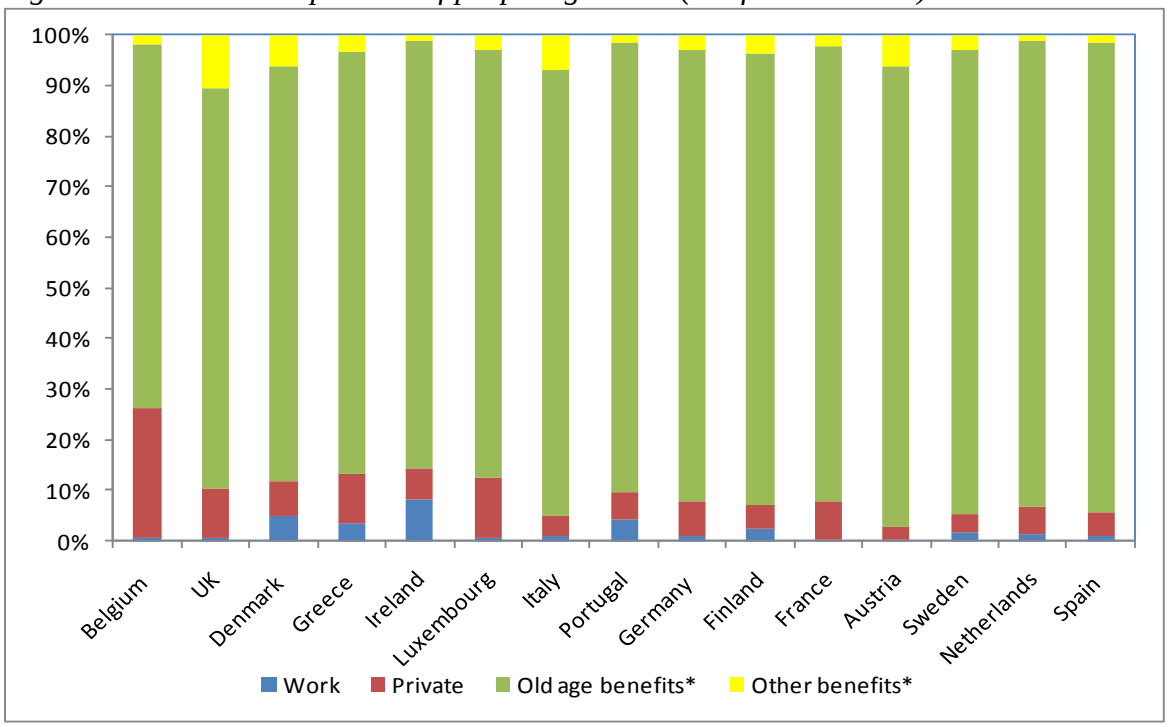
Table 1.2: Income composition of adjacent age cohorts (% of total income) in 2003

	Work	Private	Old age benefits*	Other benefits*
Ireland				
55-64	76.8	3.2	11.5	8.5
65-74	28.0	6.1	62.9	3.0
Denmark				
55-64	75.5	2.6	11.0	10.9
65-74	13.7	8.4	71.0	6.9
UK				
55-64	65.4	7.3	18.4	9.0
65-74	11.8	10.3	72.1	5.9
Finland				
55-64	63.8	10.5	8.0	17.7
65-74	13.7	4.7	74.3	7.3
Portugal				
55-64	53.7	5.7	32.2	8.5
65-74	16.9	3.2	76.2	3.7
Belgium				
55-64	56.8	9.5	24.9	8.8
65-74	7.7	10.5	80.5	1.3
Italy				
55-64	50.1	3.9	41.7	4.3
65-74	10.9	3.6	81.1	4.4
Greece				
55-64	62.8	5.9	28.9	2.5
65-74	10.3	6.2	81.4	2.2
Spain				
55-64	63.3	4.7	17.9	14.1
65-74	9.2	5.3	81.8	3.6
Luxembourg				
55-64	50.7	6.1	27.3	15.9
65-74	3.4	8.6	83.8	4.3
Sweden				
55-64	64.7	5.1	20.7	9.5
65-74	7.5	4.1	85.9	2.5
Germany				
55-64	55.4	6.1	26.7	11.8
65-74	5.7	5.9	86.7	1.7
Austria				
55-64	44.4	2.4	41.8	11.3
65-74	2.3	3.1	88.4	6.2
France				
55-64	57.2	5.2	29.9	7.8
65-74	3.1	6.4	88.5	2.0
Netherlands				
55-64	58.7	4.1	18.9	18.2
65-74	2.4	3.8	90.6	3.2

Note: Countries arranged in order of the importance of old age benefits for the 65-74.
**Old age benefits includes all social protection transfers intended to protect against the risks of old age – including state and occupational pensions, survivors benefits and in kind benefits. Other benefits include social assistance, housing benefits and disability benefits.*
Source: Zaidi et al (2006).

The drop in the importance of income from work is even more evident when one looks at the income composition for those aged above 75+, shown in Figure 1.4. At older ages, dependence on old-age benefits rises substantially in all countries (except Belgium) to reach 80% or more of total income.

Figure 1.4: Income composition of people aged 75+ (% of total income) in 2003



Note: Countries arranged in order of the importance of old age benefits for the 75+.
** Old age benefits includes all social protection transfers intended to protect against the risks of old age – including state and occupational pensions, survivors benefits and in kind benefits. Other benefits include social assistance, housing benefits and disability benefits.*
Source: Zaidi et al (2006).

Moreover as shown in Table 1.3, dependence on benefits is relatively high in all countries for those on low incomes, even before the age of 65. Reliance on pensions differs to a larger extent, reflecting early retirement policies. But even in countries like the UK and Denmark, which do not allow citizens to draw their state pension early, most of the income of the bottom income quintile of the population aged 55-64 comes from the state. The main cross-national difference in the importance of pension transfers lies in the middle-to-high income group. Countries with flat-rate pension systems, such as the UK and Ireland, provide considerably less income to the top quintile. Countries with a social democratic welfare system, such as Sweden and the Netherlands, do not show this marked difference. This changes when one looks at older ages, and dependence on old-age benefits appears to spread more equally across income groups.

Table 1.3: Sources of income of elderly people by income group (% of total) - 2003

55-64

	Bottom 20%				Middle 60%				Top 20%			
	Work	**Priv**	**Old age ben**	**Oth ben**	**Work**	**Priv**	**Old age ben**	**Oth ben**	**Work**	**Priv**	**Old age ben**	**Oth ben**
Ireland	28	0	14	58	76	2	14	8	86	4	9	1
Finland	31	2	14	52	59	2	10	28	70	17	6	8
Netherlands	29	4	17	51	54	2	20	24	66	6	19	9
UK	34	8	21	37	61	5	22	11	74	9	14	3
Portugal	43	3	29	25	59	3	26	12	50	9	38	3
Spain	25	8	31	36	60	4	19	17	73	5	15	7
Greece	56	3	35	7	61	4	31	3	66	8	25	1
Italy	51	3	35	10	43	3	50	4	59	5	32	3
Luxembourg	14	3	35	48	37	5	38	20	72	8	15	5
Sweden	28	3	39	30	57	2	27	15	72	8	15	5
Germany	23	4	40	34	52	3	32	13	66	10	17	6
France	34	6	40	20	45	5	41	8	68	5	20	6
Denmark	17	4	41	38	67	2	15	16	90	3	3	3
Belgium	11	4	44	41	49	5	36	10	68	14	15	4
Austria	15	2	44	38	34	2	50	14	63	3	31	3

65-74

	Bottom 20%				Middle 60%				Top 20%			
	Work	**Priv**	**Old age ben**	**Oth ben**	**Work**	**Priv**	**Old age ben**	**Oth ben**	**Work**	**Priv**	**Old age ben**	**Oth ben**
Denmark	2	7	79	12	12	8	74	6	32	12	54	2
Greece	10	3	82	4	9	5	84	2	13	12	75	0
Sweden	1	2	83	14	4	3	91	2	16	7	76	1
Portugal	5	1	85	9	17	2	77	4	23	7	70	1
UK	2	4	85	9	8	8	76	8	23	17	59	1
Ireland	5	2	86	8	20	4	72	4	48	11	41	0
Austria	0	3	86	11	1	2	92	5	7	5	84	4
Finland	3	1	86	10	9	4	79	8	26	7	62	5
Spain	3	2	88	6	6	4	87	3	21	10	66	3
France	1	5	89	4	3	6	90	2	4	8	86	1
Italy	2	1	89	8	5	2	89	5	25	7	65	3
Germany	1	3	91	4	4	4	90	1	12	10	77	1
Luxembourg	1	1	91	7	2	6	88	4	9	19	69	3
Netherlands	1	1	91	7	1	3	92	4	4	6	88	1
Belgium	1	3	92	4	4	7	87	1	21	24	54	0

Note: Countries arranged in order of the importance of old age benefits for the bottom 20%.
** Old age benefits includes all social protection transfers intended to protect against the risks of old age – including state and occupational pensions, survivors benefits and in kind benefits. Other benefits include social assistance, housing benefits and disability benefits.*
Source: Zaidi et al (2006).

Conclusion

Existing evidence suggests pensions are the main source of income for people aged over 65. There are some differences as to the relative importance of the state, but this is limited to middle-to-high income groups. In the entire EU, low income individuals depend crucially on the state for support. Having verified the importance of state pensions in determining incomes of elderly people, we can now pass on to assess to what extent this income currently enables

elderly people to maintain living standards relative to their working age counterparts, and also not to be at-risk-of-poverty.

1.22 The income of elderly people relative to that of the working age population

Once harmonised data were available, cross-national comparisons of the income of elderly people mushroomed. Hedstrom & Ringen (1985) was one of the first papers to use the LIS database for this purpose, and studied whether there was evidence of Rowntree's 'cycle of poverty'[25] in a cross-national environment, and the role played by income transfer policies in reducing transitions into poverty at particular stages of life. The authors observed that "among the elderly, Germany, Norway and Sweden make up one category with relatively high levels of transfer incomes; Canada, Israel and the US an opposite category; and Britain a category of its own in between". Despite transfers that reduce the drop in income substantially, the study found evidence of a Rowntree-type cycle in all countries, as shown in Table 1.4.[26]

*Table 1.4: Disposable family income in relation to the national mean (by age)**

	>24	**25-34**	**35-44**	**45-54**	**55-64**	**65-74**	**75+**
Canada	0.62	0.99	1.22	1.30	1.06	0.71	0.54
Germany	0.62	0.94	1.25	1.60	0.97	0.63	0.53
Israel	0.81	1.09	1.25	1.21	0.97	0.63	0.60
Norway	0.68	1.09	1.33	1.27	1.09	0.74	0.51
Sweden	0.63	1.13	1.34	1.25	1.08	0.82	0.61
UK	0.86	1.13	1.31	1.37	1.00	0.55	0.44
US	0.60	0.99	1.25	1.31	1.09	0.75	0.57

** Data are for 1979, except for Sweden and Canada (1981).*
Source: Hedstrom & Ringen (1985).

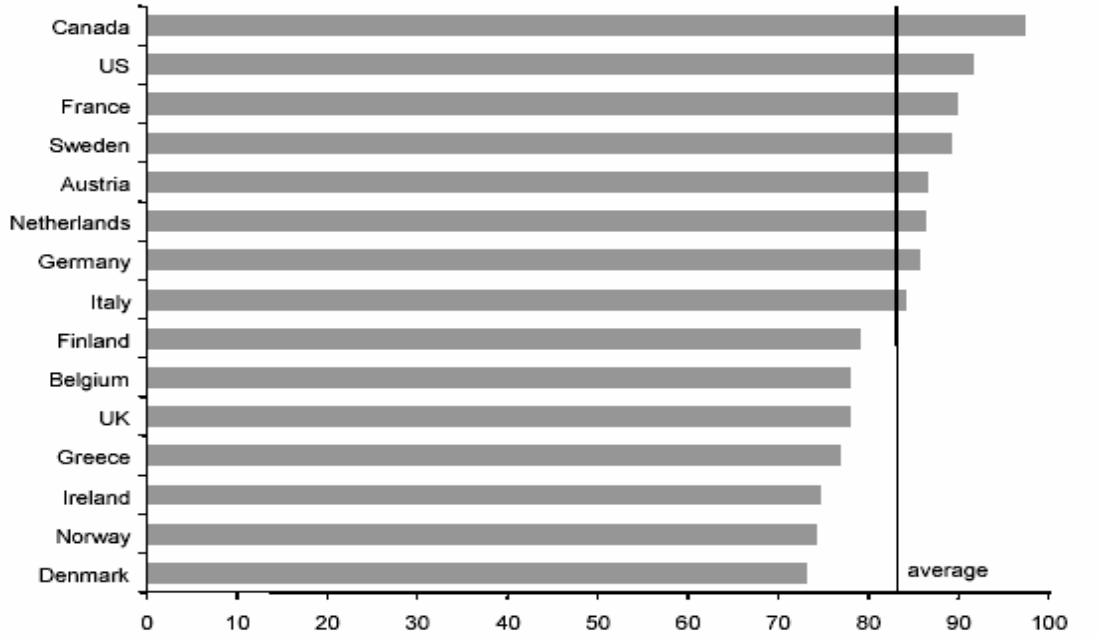
Casey & Yamada (2001), similarly, find that income falls with age, and estimate that the incomes of people over retirement age in most countries at between 70 and 80% of those of working age people. Interestingly the authors found that "regardless of the public-private mix of pensions and the importance or otherwise of work, the income of retirement-age people, relative to that of working-age people, is rather similar" across the nine countries they surveyed. However the consumption level of older singles, mainly women, was found to be relatively much smaller than that among elderly couples.

Disney & Whitehouse (2002) provides a good review of the international comparative work done in the 1990s in this field. Noting that "the simplest measure of the relative

[25] In his classical study of poverty in York, Rowntree (1901) had observed that the standard of living of families fluctuated over the life course, with childrearing and old age resulting in sharp poverty.
[26] Achdut & Tamir (1985) has similar results.

economic well-being of older people is to compare their average incomes with those of the population as a whole", the authors note that in 1994/95 "averaging across the 15 countries, older people's equivalent incomes are 83 per cent of those of the population as a whole".

*Figure 1.5: Pensioners' disposable income as a % of population average disposable income**



** Data are from 1994 and 1995, except for Italy (1993); income is adjusted for household size by dividing by the square root of the number of household members.*
Source: Disney & Whitehouse (2002).

Despite the advances made after the introduction of LIS, comparisons were still hampered by data availability and time lags. These problems decreased with the advent of EU-SILC, which provides timely and harmonised EU income data. Table 1.5 presents EU-SILC 2005-07 data by gender on the median equivalised income[27] of elderly people compared to that of the working age population. Across the EU25, elderly people have a median income equal to 86% that of the working age population. There is considerable variation amongst countries, with those in Eastern Europe reporting high levels of relative incomes. In Poland those aged 65+ enjoy a higher median income than those of working age, while in Cyprus, median incomes drop to less than 60%. The income situation of those aged 75+ is worse than that of those aged 65+, but still the EU25 average is relatively high, at 82%.

[27] Median equivalised income is mean total household disposable income divided by its equivalent size according to the OECD modified scale. See European Commission (2006).

Table 1.5: Relative income ratios of elderly people by gender - median equivalised incomes of 65+ and 75+ by gender as % of that of the working age population by gender (2005-2007)*

	65+			75+		
	Male	**Female**	**All**	**Male**	**Female**	**All**
EU25	***89***	***83***	***86***	***85***	***80***	***82***
Cyprus	*62*	*57*	*56*	*52*	*50*	*49*
Ireland	*67*	*66*	*65*	*63*	*62*	*62*
Estonia	*71*	*66*	*68*	*66*	*61*	*64*
Latvia	*77*	*75*	*68*	*75*	*75*	*67*
Denmark	*73*	*71*	*69*	*67*	*68*	*66*
UK	*70*	*68*	*69*	*66*	*65*	*65*
Belgium	*72*	*73*	*72*	*68*	*70*	*68*
Finland	*79*	*70*	*72*	*75*	*65*	*67*
Lithuania	*79*	*67*	*73*	*76*	*63*	*68*
Spain	*75*	*74*	*73*	*70*	*71*	*69*
Portugal	*81*	*75*	*77*	*69*	*70*	*69*
Sweden	*84*	*73*	*77*	*77*	*66*	*69*
Malta	*79*	*80*	*78*	*78*	*80*	*78*
Czech Rep	*80*	*78*	*80*	*76*	*75*	*77*
Greece	*85*	*79*	*81*	*76*	*73*	*75*
Slovakia	*86*	*79*	*82*	*80*	*74*	*77*
Italy	*87*	*82*	*83*	*83*	*80*	*81*
Netherlands	*88*	*85*	*83*	*83*	*84*	*81*
Slovenia	*92*	*79*	*84*	*91*	*75*	*80*
France	92	88	87	89	86	85
Germany	89	87	88	89	85	87
Austria	97	89	90	92	85	87
Luxembourg	88	87	94	87	88	95
Hungary	99	88	95	99	86	94
Poland	110	95	103	114	95	104

Note: Countries arranged according to the size of their relative income ratio for the 65+. Countries with an above EU average gap are in italics.

**Equivalised median income is "the households' total disposable income divided by its 'equivalent size', to take into account of the size and composition of the household, and is attributed to each household member (including children)", using the OECD modified scale.*

Source: Own analysis using EU-SILC (2005-07).

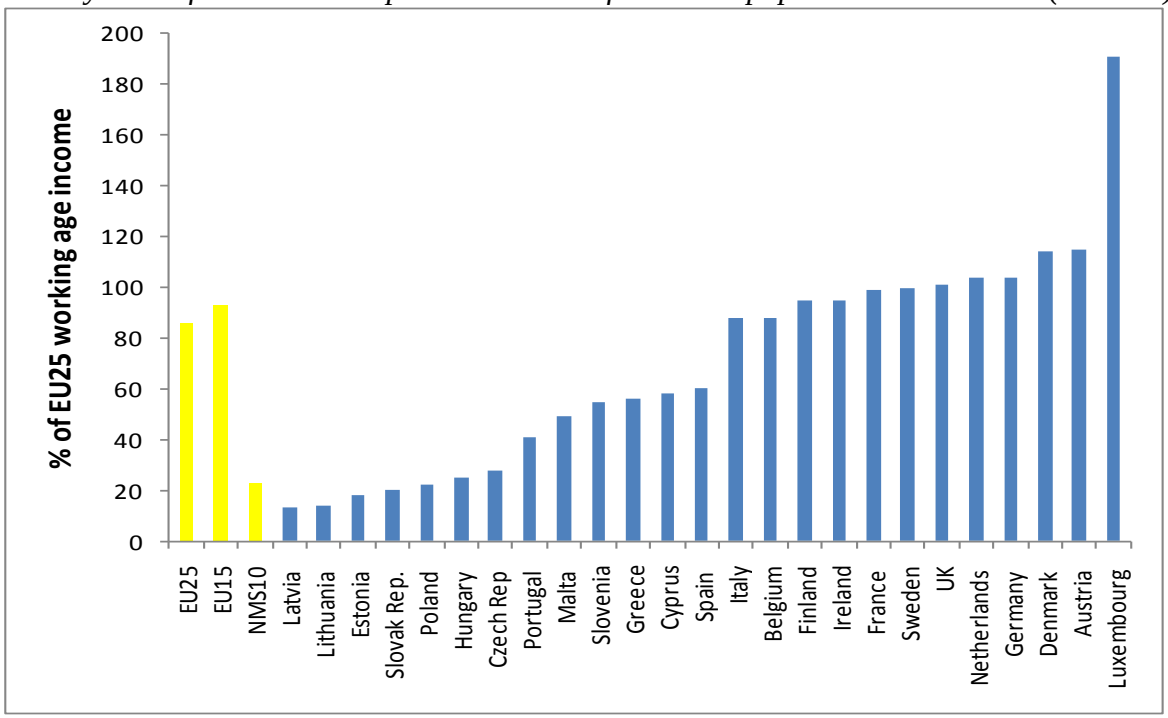
Relative income ratios by gender vary considerably. The new Member States have the largest gap, mostly reflecting the unequal pension outcomes in Poland.[28] The gender gap decreases for the 75+, possibly on account of greater access to pensions at these ages – as women start benefiting from survivors benefits.

The relative income ratios utilised above are computed on a national basis. Thus, a higher relative income ratio in a country does not necessarily mean that an elderly person in that country is better off in absolute terms than one in a country with a lower relative ratio. Figure 1.6 compares the median income of elderly people in a country to the median income of working age people across the EU25. In some countries elderly people are better off than the average European working age individual – in Luxembourg, on average, elderly people are

[28] Despite this, elderly women in Poland still have the highest relative income ratio in the EU.

nearly twice as well off. Even in countries with low relative income ratios, the elderly are relatively 'rich' in an absolute sense. Thus though in the UK the elderly have a median income just 69% of their working age counterparts, they still earn as much as the average European working age individual. By contrast, while Polish elderly people earn more than working age Poles, they have an income that is less than a quarter of that of the average European worker. Note that this difference in absolute terms does not exactly mirror that found in the median incomes for the working age population. For example, while working age people in Ireland have a higher income in purchasing power terms than those in Germany, Irish people aged 65+ only have an income three-quarters that of their German counterparts. A similar drop occurs in Cyprus, Denmark and the UK. By contrast, elderly people in Luxembourg, Hungary, Austria and Poland are relatively better off than their working age counterparts.

Figure 1.6: Median disposable income (in purchasing power parity) of the 65+ in each country as % of the median disposable income of the 16-64 population in the EU25 (2005-07)

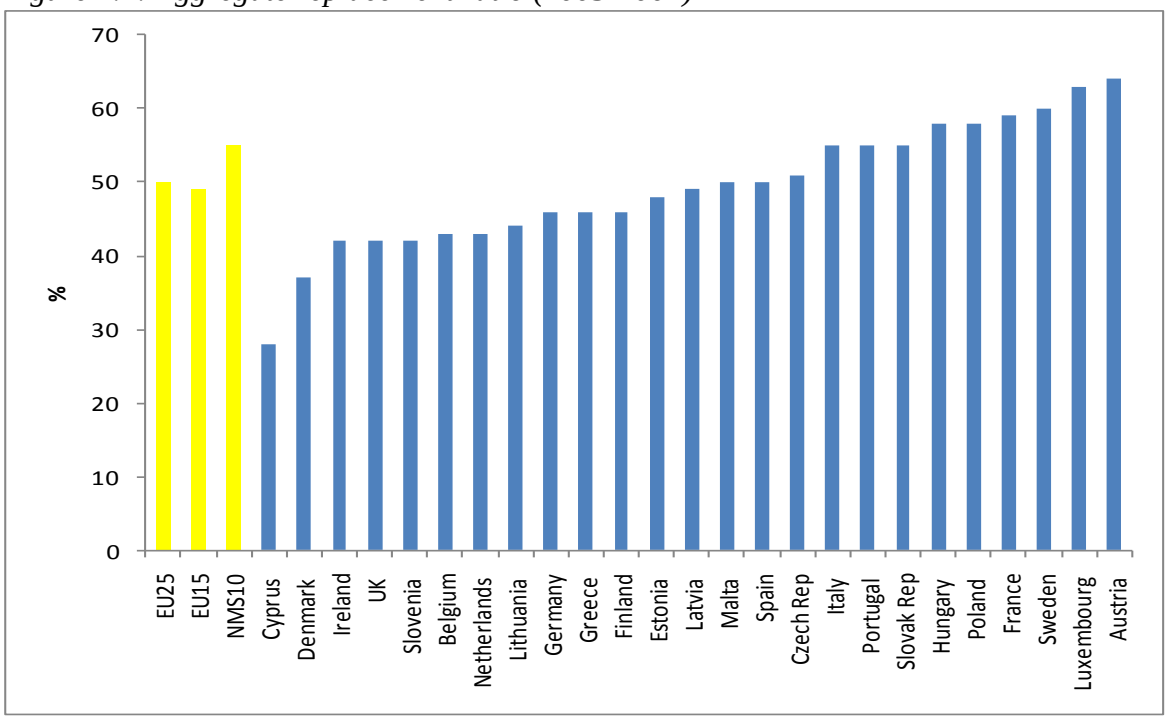


Source: Own analysis using EU-SILC (2005-07).

Pension generosity plays a significantly different role in consumption smoothing across Europe. Figure 1.7 presents data on one of the pension OMC indicators - the aggregate replacement ratio, which compares the median pension income of retirees aged 65-74 to the median earnings of employed people aged 50-59. This is a pseudo-replacement rate as the pensions earned by the individuals currently aged 65-74 were not determined by the wages earned by those aged 50-59, and there may be cohort effects. Moreover many low earners leave the labour force quite early and this may bias upwards the income of the 50-59

category.[29] However this indicator still provides some useful information on the importance of pensions in determining income of the elderly. In some countries, such as Cyprus, Denmark and Ireland, median pensions appear to be significantly lower than the earnings of older workers, while in six countries they stand at close to 60% or over.

*Figure 1.7: Aggregate replacement ratio (2005-2007)**



**Median individual pension income of retirees aged 65-74 in relation to median earnings of employed people aged 50-59 excluding other social benefits.*
Source: Own analysis using EU-SILC (2005-07).

Conclusion

Prior to the advent of EU-SILC, comparisons of the relative income of elderly people tended to be incomplete and lacked updated data. EU-SILC allows a more comprehensive analysis. This reveals that in most countries across the EU, the income of elderly people is lower than that of their working-age counterparts; as pensions increasingly replace only part of former income. In many countries the drop seems to be more felt by women. The analysis also suggests that while the drop in Eastern European countries may appear smaller in relative terms, in absolute terms elderly people in this part of Europe have access to very limited monetary resources compared to their Western European counterparts.

[29] The employment rate above age 50 is less than two-thirds that for younger ages.

1.23 The risk-of-poverty among elderly people

Average income measures do not give us much information on the presence of poverty in a country. There are two approaches to define poverty: an absolute standard (a sort of subsistence income); and a relative standard (defined in comparison with societal living standards).[30] The most common measure in international studies is the proportion of the population with incomes below some ratio of average income.[31]

Table 1.6: Poverty rates in OECD countries in 2000

	65-75	**76+**	**All ages**
New Zealand	0.4	0.5	10.4
Czech Rep	1.3	3.5	4.3
Netherlands	1.5	1.8	6.0
Denmark	3.8	9.0	4.3
Luxembourg	3.8	9.0	5.5
Canada	4.0	5.0	10.3
Poland	4.0	5.0	9.8
Sweden	4.6	11.5	5.3
Hungary	5.5	4.8	8.1
Norway	5.5	19.9	6.3
Finland	7.0	16.1	6.4
Austria	7.6	11.6	9.3
Germany	9.7	10.7	8.9
France	9.9	11.3	7.0
Switzerland	10.4	12.7	6.7
Belgium	10.7	18.6	7.8
UK	11.4	19.2	11.4
OECD	**11.4**	**16.5**	**10.4**
Italy	14.6	16.4	12.9
Spain	14.8	9.3	11.5
Turkey	16.7	15.3	15.9
Japan	19.5	23.8	15.3
US	20.3	29.6	17.1
Australia	20.6	28.8	11.2
Greece	22.2	28.0	13.5
Mexico	24.1	36.6	20.3
Portugal	25.4	35.4	13.7
Ireland	31.1	42.6	15.4

Note: Countries ordered according to the size of the poverty rate of their 65+ population.
** Proportion of the people in that age group with an income less than 50% of the median equivalised disposable income of all individuals, where household disposable income is equivalised using the square root of household size.*
Source: Forster & Mira d'Ercole (2005).

[30] See Ravallion (1992), which presents the findings of the World Bank's Living Standards Measurement Study, or Rio Group (2006), a more recent UN effort to document best practice in poverty measurement. For a discussion more focused on developed countries, see Forster (1994) or Atkinson (1991), and for a more technical discussion of poverty measurement see Atkinson (1987).

[31] Though some studies (e.g. Johnson (1998)) define poor older people as those in the bottom fifth of the overall income distribution.

Forster & Mira d'Ercole (2005), focusing on income distribution and poverty in 27 OECD countries during the second half of the 1990s,[32] indicate a wide variation in poverty rates among elderly people, ranging from 0.4% in New Zealand to 31.1% in Ireland, and higher poverty rates for people aged 76+ (see Table 1.6). Poverty among elderly people has dropped significantly over recent decades. Whitehouse (2000) reports that between the mid 1970s and the early 1990s, pensioners' incomes grew significantly faster than those of the population as a whole in the 44 countries he surveys, resulting in a marked decline in elderly poverty. Forster & Mira d'Ercole (2005), however, suggest that this improvement has stalled, and conclude that "declines in the relative income of people aged 66 to 75 over the second half of the 1990s occurred in about half of the countries reviewed".

The main issue with these studies is the extent to which data are adequately harmonised. EU-SILC has addressed most of these concerns and provides much better and timelier data. Table 1.7 presents 2005-2007 EU-SILC data on the percentage of the population living on incomes below 60% of the national median level. While the median income of the 65+ population in the EU25 stands at nearly 90% that of the total population, nearly a fifth live on less than three-fifths median income. More than half Cypriot elderly people are at-risk-of-poverty, while around a third of those in Ireland, Latvia and Spain are in the same position. By contrast, poverty rates are very small in many Eastern European states, where the elderly appear to be less at-risk-of-poverty than those of working age. This is not the case in the old Member States, where the proportion of elderly in poverty is more than a third higher than that among working-age people. The transition to old age appears to be quite critical in Cyprus, Ireland, Greece, Spain and the UK, as poverty rates for the elderly are substantially higher than those observed among working-age individuals. The shock is more pronounced for women, with the gap in poverty rates increasing even in Scandinavian countries.

[32] This study uses data sent by Member States for an OECD questionnaire. Ritakallio (2001), by contrast, uses LIS to evaluate similar issues.

Table 1.7: Poverty rates in 2005-2007 (% with less than 60% of median equivalised disposable income)

	65+			***16-64***		
	Total	***M***	***F***	***Total***	***M***	***F***
EU25	***19***	***16***	***21***	***15***	***14***	***15***
Czech Rep	5	2	8	9	8	10
Hungary	7	5	9	13	14	13
Netherlands	7	7	8	9	9	10
Luxembourg	8	8	8	13	12	14
Poland	8	6	9	19	20	19
Slovakia	8	3	11	11	11	11
Sweden	11	7	14	11	11	10
Germany	15	12	17	13	13	14
Austria	15	10	18	11	10	12
France	15	14	17	12	12	13
Denmark	18	16	19	11	11	11
Slovenia	*20*	*11*	*25*	*10*	*10*	*10*
Malta	*20*	*22*	*19*	*12*	*10*	*13*
Finland	*21*	*15*	*24*	*11*	*12*	*11*
Belgium	*22*	*21*	*24*	*13*	*12*	*13*
Italy	*22*	*18*	*25*	*18*	*16*	*19*
Lithuania	*23*	*10*	*29*	*18*	*18*	*18*
Greece	*26*	*23*	*27*	*18*	*18*	*19*
Estonia	*26*	*15*	*32*	*16*	*16*	*17*
Portugal	*27*	*26*	*27*	*16*	*15*	*17*
Latvia	*28*	*17*	*34*	*19*	*19*	*20*
UK	*28*	*25*	*30*	*16*	*15*	*16*
Spain	*29*	*27*	*32*	*16*	*16*	*17*
Ireland	*30*	*26*	*33*	*16*	*15*	*17*
Cyprus	*51*	*48*	*54*	*11*	*9*	*13*

Note: Countries ordered according to the size of the poverty rate of their 65+ population. Countries with a poverty rate higher than the EU25 average are in italics.
Source: Own analysis using EU-SILC (2005-07).

As can be expected, there have been various definitions of poverty in the many academic studies which have been conducted in this field. Results of measures of income distribution and poverty risk are also quite sensitive to the choice of unit: typically, the smaller the unit of measurement, the higher poverty and inequality tend to observed.[33] Most studies are based on household incomes, but there are exceptions such as Disney & Johnson (2001) which is based on 'family' or 'income' units, consisting of a single person or couple and any dependent children. Goodman, Johnson & Webb (1997), for example, report that using the

[33] A related issue is the choice of equivalence scales. See De Vos & Zaidi (1997) for a discussion applied to the measurement of poverty in EU countries.

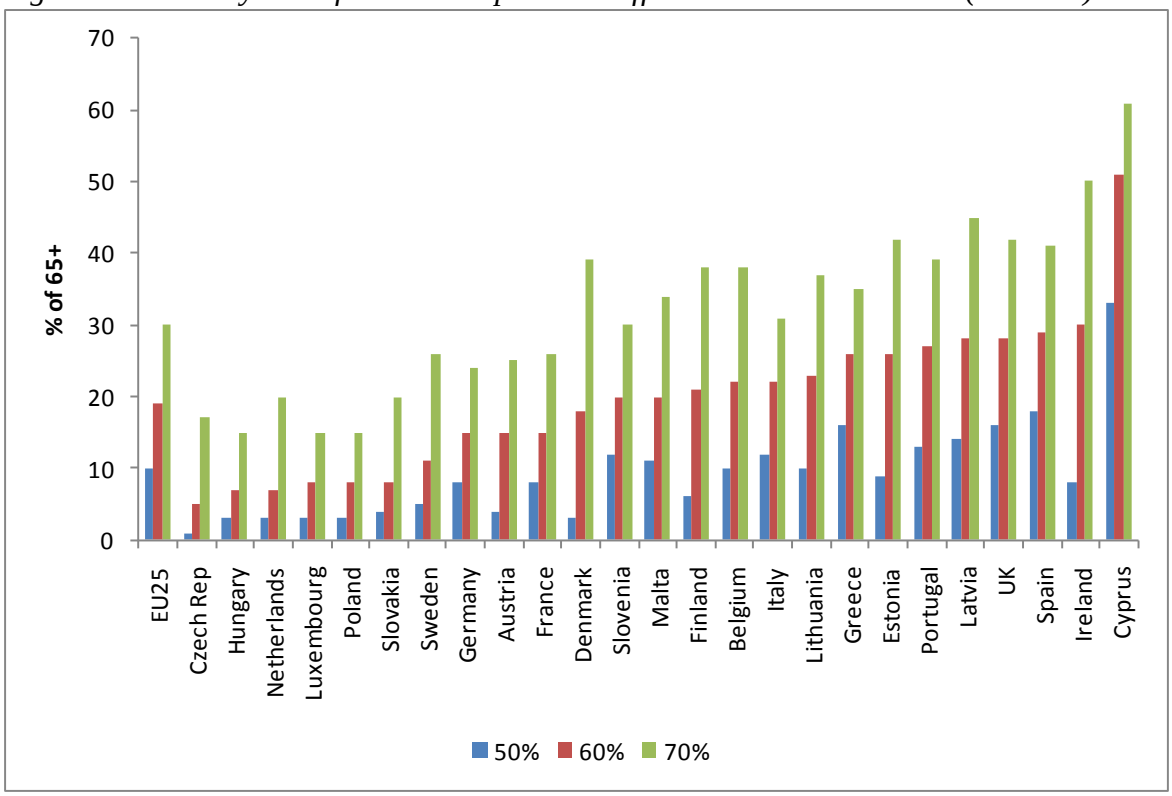
family unit in the UK would increase the proportion of the population with incomes below half the average by a third compared with household-based measures. Living arrangements make a substantial difference in income distribution incomes. Casey & Yamada (2001) shows for instance, if the elderly in Sweden had the same living arrangements as in Japan, their gross income would have been boosted by a sixth, while those in the UK would see an increase of more than 50%.

Most international studies conducted in the 1990s and early 2000s defined the poverty threshold as an income below half of the population average income. Disney & Whitehouse (2002) review a number of comparative studies on pensioner poverty and find that despite having different definitions and poverty thresholds, results were very correlated though there is significant variation (particularly for the UK). Hauser (1997) also indicates that different poverty thresholds do not lead to significant re-rankings of countries.[34]

The poverty threshold of 60% median earnings has been adopted by the EU, but until quite recently the 50% threshold was more common. Looking at poverty rates computed using different thresholds gives a sense of the 'depth' of poverty. EU-SILC data (see Figure 1.8) show that by applying a 70% threshold, the poverty rate would rise from 20% to 31% in the EU15 and from 10% to 19% in the NMS10. Conversely applying a 50% threshold halves the risk-of-poverty in both groups of Member States. For most countries changing the poverty threshold makes little difference in their relative position. However there are some exceptions. For instance with a 50% poverty threshold, Ireland would have a poverty rate lower than the EU25 level, whereas with the current threshold, it is one of the countries with the highest rates. Conversely with a 70% threshold Denmark would have a poverty rate much higher than the EU average, instead of its current average position. With a 50% threshold, poverty in Scandinavian countries would fall to the very low levels observed in Eastern Europe.

[34] Conversely Ravallion (2003) argues that differences in concepts and definitions (together with data sources and measurement assumption) are very important and often create sharply conflicting claims.

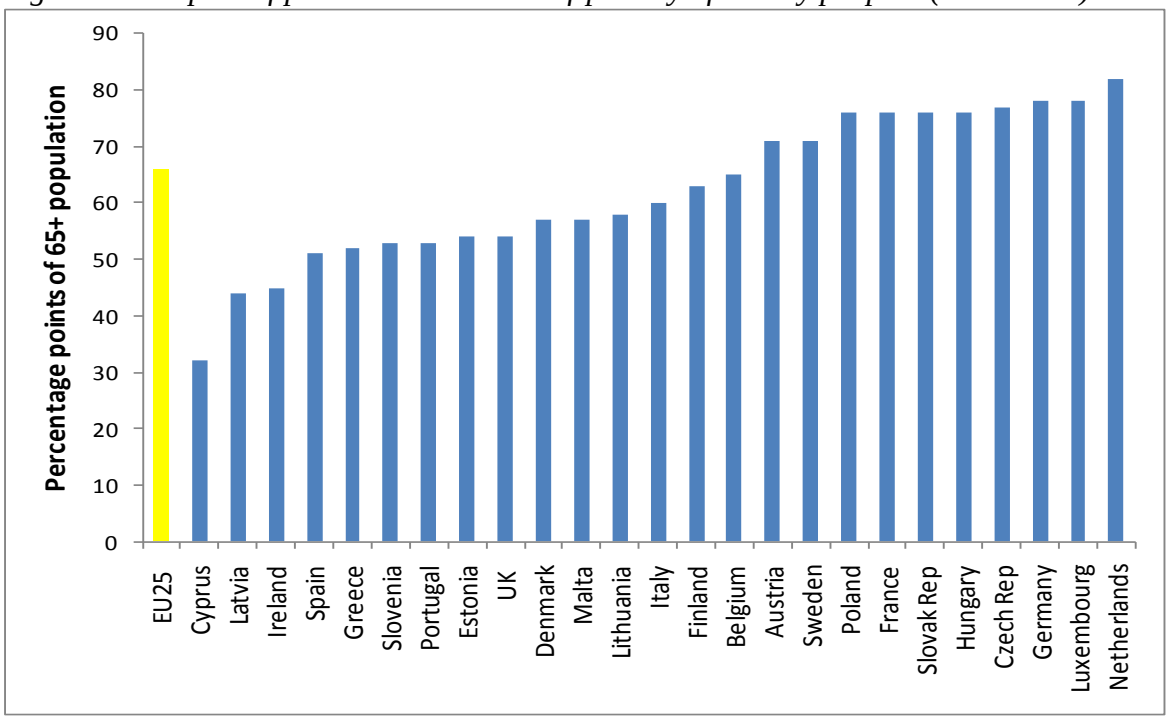
Figure 1.8: Poverty rates for 65+ computed at different income thresholds (2005-07)



Note: Countries ordered according to poverty rate of 65+ population computed using the 60% threshold.
Source: Own analysis using EU-SILC (2005-07).

Another way of assessing the effectiveness of pension transfers involves comparing the poverty risk data before and after the transfer of pensions, as shown in Figure 1.9. If one adopts the 60% poverty threshold, pensions account for a drop of 67 percentage points in the risk-of-poverty for the total 65+ population. The effect is significantly stronger for men, 69% compared to 61% for women. The drop is much less pronounced in several countries, like Cyprus, Ireland, Denmark, Spain and Greece. It is also quite weak when looking at women in Portugal, Latvia and the UK. Women in Cyprus, Ireland and Portugal appear to be the ones benefiting from the lowest pensions in Europe – they lift just a third of them out of poverty. By contrast, pensions in the Netherlands seem to be achieving greater results, lifting 85% of the 65+ population above the 60% poverty threshold.

Figure 1.9: Impact of pensions on the risk-of-poverty of elderly people (2005-2007)*



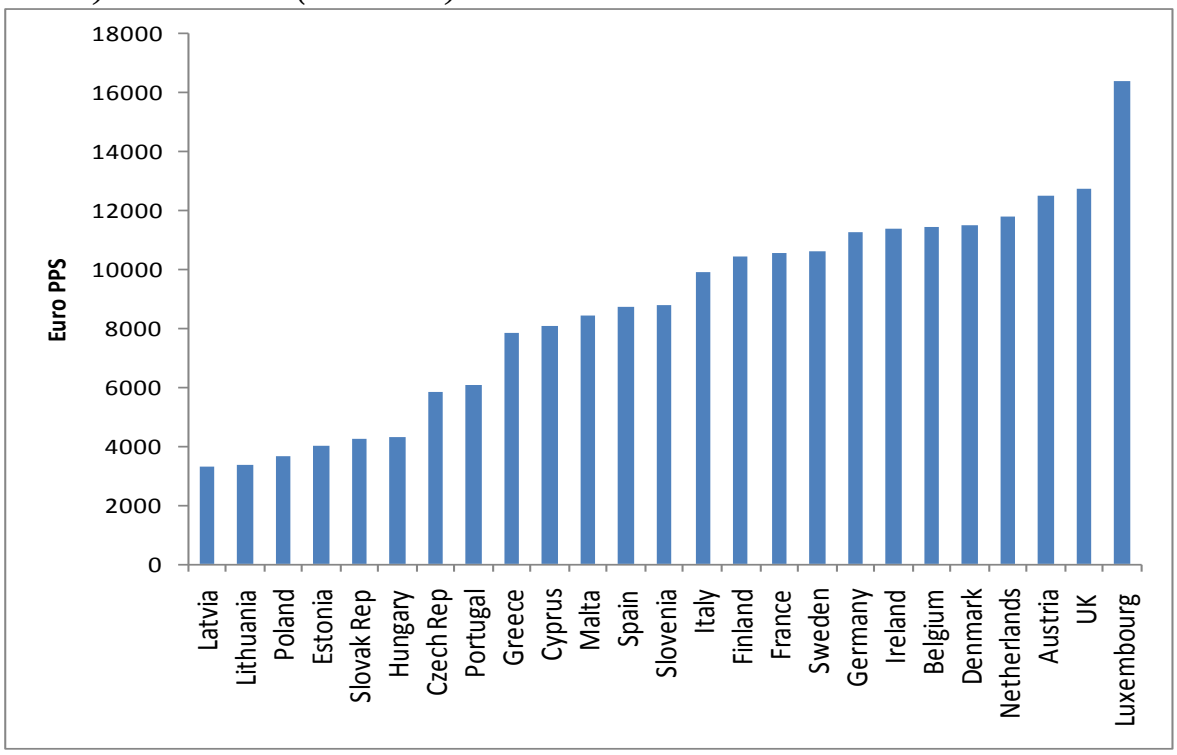
** Difference in percentage points between the poverty rate (at the 60% threshold) before and after pension transfers.*
Note: Countries ordered according to the size of the drop in the poverty rate.
Source: Own analysis using EU-SILC (2005-07).

Looking at the impact of pensions at different poverty thresholds provides further interesting insights on how many people live close to the 60% poverty threshold. For instance, with a poverty threshold of 50% of median income, pensions would lift 77% of the elderly out of poverty in Denmark, more than the EU25 average; whereas with the 60% threshold pensions in Denmark under-perform significantly compared to the rest of Europe. A similar, though less pronounced, effect is observed in the UK, Cyprus and Ireland, suggesting that the relative effectiveness of flat rate pension schemes changes significantly with the poverty threshold that is selected. Conversely in France, the relative poverty reduction strength of pensions does not vary in this way. The data also show that the 'depth' of poverty among Portuguese and Cypriot women is such that changing poverty thresholds does relatively little to increase the effectiveness of pension transfers.

When looking at international comparisons of poverty rates, one needs to keep in mind that while the poverty threshold of a low-income and a high-income country will be defined as a given percentage of median earnings, the latter's level will differ considerably. In absolute terms, the poor in a high-income country may be significantly richer than those in the low-income country. Figure 1.10 reproduces the at-risk-of-poverty thresholds (adjusted for purchasing power differences) used by Eurostat to compute national poverty rates. This

indicates that even after taking into account differences in living costs, poverty thresholds vary considerably. A single person living in Luxembourg earning slightly less than 5 times the median income of the average Latvian would be considered poor in Luxembourgian terms, while a single person living in Latvia earning slightly more than one fifth the average income of a person in Luxembourg would not be considered at-risk-of-poverty in Latvian terms.

Figure 1.10: Risk-of-poverty thresholds for a one-person household (60% median equivalised income) in Euro PPS (2005-2007)*



** Purchasing Power Standard (PPS) is a common artificial currency, which modifies the exchange rate to take into account price level differences.*
Source: Own analysis using EU-SILC (2005-07).

Kangas & Ritakallio (2004) recalculate poverty rates using a common European poverty line – essentially treating the whole of the EU as a single polity. While this approach may seem inappropriate, one needs to consider that "within-nation differences are sometimes more pronounced than differences between nations" such that the national mean is not that representative. The use of a common EU poverty line increases the number of poor people from 54 to 63 million. As Table 1.8 shows, the poverty rate rises substantially in Mediterranean countries when one uses this poverty line. This reflects the lower relative median income of this part of the EU. Extending this analysis to include other poor EU countries such as Greece, Portugal and the new Member States would further change the ranking of poverty by country.

*Table 1.8: Alternative poverty risk rates (% below 60% of median equivalised income)**

	National poverty line	European poverty line
Overall	**15.5**	**18.2**
Sweden	7.1	5.1
Finland	7.9	4.5
Luxembourg	10.2	0.7
Belgium	11.0	7.5
Netherlands	11.3	9.9
Denmark	11.7	6.8
Germany	13.1	9.4
France	14.9	11.3
Austria	16.2	14.2
Spain	16.2	43.7
Ireland	17.6	32.2
Italy	18.3	27.3
UK	20.0	19.0

** Poverty threshold set at either 60% of national median equivalised income or at 60% of the European median equivalised income.*
Source: Kangas & Ritakallio (2004).

Casey & Yamada (2001) provide further absolute comparisons of wellbeing.[35] These data, for the mid-1990s, interestingly indicate that countries with similar GDP per capita can have very different levels of absolute poverty. For instance, though GDP per capita and the mean disposable income of the retired population of Sweden and the UK are similar, the proportion of retired having less than a certain amount of income differs greatly.

*Table 1.9: Absolute comparisons of wellbeing in purchasing power parities (mid-1990s)**

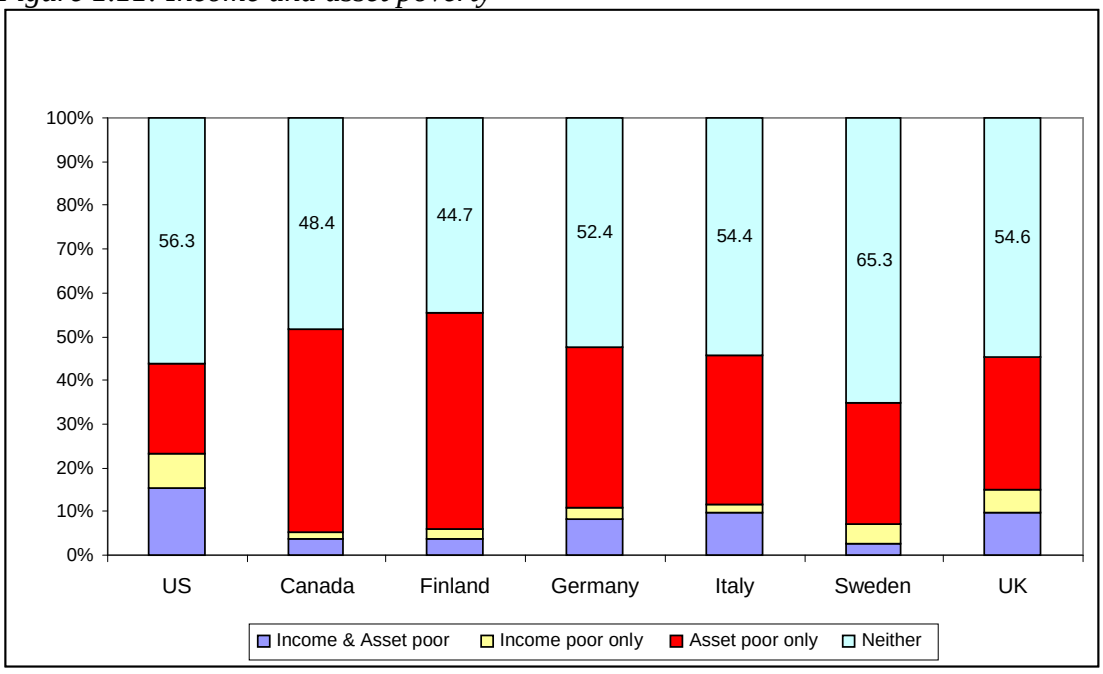
	Mean disposable income of retired population ($000s)	GDP per capita ($000s)	Mean disposable income of bottom quintile ($000s)	50% of median disposable income of working age($000s)	% of retired with less than 7,000$ income	% of retired with less than 10,000$ income
Canada	17	21	8	10	1	11
Finland	12	19	7	7	7	41
Germany	14	20	7	7	8	27
Italy	13	20	5	6	20	45
Japan	18	23	7	9	14	26
Netherlands	12	19	5	7	9	51
Sweden	12	19	7	7	4	28
UK	12	19	6	8	17	53
US	18	26	6	10	12	27

** Purchasing power parities adjust for differences in price levels between countries.*
Source: Casey & Yamada (2001).

[35] Another example is Blackburn (1998).

All the above discussion dealt with income-based poverty measures. Sierminska et al (2007) extend the cross-national comparative literature by looking at asset and wealth-based poverty measures using the Luxembourg Wealth Study (LWS).[36] They choose "a poverty definition of households with financial assets below one quarter of adjusted median household incomes (or one-half of the poverty line) for the whole population". Hence households who cannot live above a poverty line of 50% median income for six months by running down their financial assets are deemed asset poor. Looking at seven countries (see Figure 1.11), they note that that asset poverty "is lowest in Sweden, followed by the United States, and is 40 percent or more in all other nations". If one combines both income and asset poverty measures, the US has the highest fraction of at risk older people, at about 15% compared to below 10% in the other nations.

Figure 1.11: Income and asset poverty



Source: Sierminska et al (2007)

Conclusion

This section looked at evidence on the risk-of-poverty among the population aged 65 and over. EU-SILC data confirm that in most countries, this transition results in an enhanced poverty risk. There are, however, significant differences among countries. Applying different poverty thresholds changes a bit the picture, but not that dramatically in most cases. The only major

[36] This is similar to the LIS but focuses on the measurement of wealth and assets. Another growing area of research involves the development of non-monetary poverty indicators based on the presence of material deprivation. See Boarini & Mira d'Ercole (2006) for an extensive discussion.

differences occur when one applies European-wide poverty thresholds, which result in the Eastern European countries losing their lead. However, the most important finding of this section is that pensions are a major determinant of the risk-of-poverty among the elderly, and that there are rather pronounced differences in their effectiveness across European countries.

1.3 Conclusion

This Chapter reviewed the role of pensions and their effective importance in sustaining the income of elderly people. It showed that while there are significant differences as to the size and design of pension systems, pensions tend to be by far the single most important government outlay. Pensions are mostly provided on a collective rather than individual basis. This reflects market failures (such as adverse selection, moral hazard, myopia and imperfect capital markets) but also recognition of the economies of scale which favour collective organisation of pension provision.

The review of existing literature on the income of elderly people revealed that while income falls with age, the drop following retirement is not dramatic despite significant state-private differences in retirement provision across Europe. This was confirmed looking at EU-SILC data, which improve on previous sources by being more harmonised and timely. State pensions are particularly important for those on lower incomes, women and the very old. The data, however, indicate that there are noticeable differences in the poverty alleviation and income replacement effects of different state pension schemes. International comparisons reveal that while "different schemes for income maintenance in old age produce very different anti-poverty results",[37] having similar pension systems does not necessarily lead to similar income distribution or poverty. For instance, Frericks et al (2006) shows how two similar state systems in Denmark and the Netherlands, both providing "work-independent universal pension entitlements based on duration of residence" end up producing different poverty risks.

Thus, while comparisons of data on pension spending and on the income of elderly people suggest substantial differences among countries, a more holistic approach needs to be adopted to understand better the impact of different pension systems. In this light, the next Chapter will seek to integrate the data reviewed here to reflect the interaction of inputs and outputs of pension systems. The conclusions from this analysis will then be used to reveal similarities between different groups of countries and facilitate cross-country comparisons of current and reformed pension systems.

[37] See Smeeding (2001).

2. The different pension systems of EU Member States

The previous Chapter explored the aims of state pension systems and presented evidence on the expenditure incurred on these programmes and on the income characteristics of elderly people in EU countries. It showed that while state pension systems are very important in all countries, there are clear differences in how successful countries are in achieving the aims of pension systems. However, this review suggested that it is relatively difficult to understand the real differences among pension systems. Looking at the various indicators that are now available through EU-SILC, one is left unsure as to the interaction between the inputs and outputs of the various pension systems, and consequently on how to assess how reforms may change their performance.

The indicators presented in the previous Chapter should be seen as only the starting point of any assessment of the effectiveness of pension systems and as inputs to more comprehensive assessment methods. In this light, in this Chapter we will use these indicators to categorise countries in a new way that facilitates analysis and cross-country comparisons of pension systems and the impact of reforms.

2.1 Taxonomies of pension systems

There is a very extensive literature dealing with the categorisation of welfare systems. Possibly the most influential research is Esping-Andersen (1990), which identifies three types of welfare state regimes: the liberal welfare regime, the social-democratic welfare state and the corporatist welfare regime. Esping-Andersen argues that these three regimes can be distinguished in two main aspects: decommodification (the extent to which individuals or family units can achieve reasonable living standards in the absence of labour market participation) and stratification (the way countries structure rights). Anglo-Saxon countries are seen as having very low levels of decommodification, particularly when compared with the social-democratic countries. By contrast levels of decommodification are more similar between corporatist and social-democratic regimes, but there is a substantial difference in stratification as the latter is universalistic whereas the former aims at sustaining the existing hierarchy and status divisions. Esping-Andersen's work spurred a large debate in this area, leading to several other typologies of welfare states, as can be seen in Table 2.1.[38]

[38] Esping-Andersen's work has also been criticised on several fronts, particularly due to the fact the data underlying this classification are not publicly available and based on a single year. Moreover some authors

Table 2.1: An overview of typologies of welfare states

Liberal	***Corporatist***	***Social-democratic***	***Mediterranean***	***Radical***
Esping Andersen (1990)				
Liberal Low level of decommod-ification; market differentiation of welfare	*Corporatist* Moderate levels of decommodif-ication; social benefits depend on former contributions & status	*Social-democratic* High levels of decommodification; universal benefits and high degree of benefit equality		
Leibfried (1992)				
Anglo-Saxon Right to income transfers; welfare state as compensator of last resort and tight enforcer to work	*Bismarck* Right to social security; welfare state as compensator of first resort and employer of last resort	*Scandinavian* Right to work for everyone; universal-ism; welfare state as employer of first resort and compensator of last resort	*Latin Rim* Right to work and welfare proclaimed; welfare state as a semi-institutionalised promise	
Castles & Mitchell (1993)				
Liberal Low social spending and no adoption of equalising instruments in social policy	*Conservative* High social expenditures, but little adoption of equalising instruments in social policy	*Non-right hegemony* High social expenditures and use of highly equalising instruments in social policy		*Radical* Achievement of equality in pre-transfer income, but little social spending

suggest a number of likely errors and very limited empirical support for the 'three worlds' typology in the decommodification data. See for instance Scruggs & Allan (2006).

Table 2.1: An overview of typologies of welfare states (continued)

Siaroff (1994)				
Protestant liberal Minimal family welfare, yet egalitarian gender lab-our market; family benefits paid to mother but inadequate	*Advanced Christian Democrat* No strong incentives for women to work, but strong incentive to stay at home	*Protestant social-democrat* True work-welfare choice for women; family benefits paid to mother; importance of Protestantism	*Late female mobilisation* Absence of Protestantism; family benefits paid to father; universal female suffrage relatively new	
Ferrera (1996)				
Anglo-Saxon Fairly high welfare state cover-age; social assistance with means test; mixed financing system; highly integrated organisational framework public administrated	*Bismarck* Strong link between work position and social entitlements; benefits proportional to income; financed by contributions, high social assistance, schemes organised by unions and employers	*Scandinavian* Social protection as a civil right; universal coverage; generous fixed benefits for various risks; tax financed; strong organisational integration	*Mediterranean* Fragmented system of income guarantees linked to work; generous benefits with-out minimum social protection net; health care a civil right; particularism in cash payments/ financing	
Bonoli (1997)				
British Low % of cost financed by contributions; low % of GDP spent	*Continental* High % of cost financed by contributions; high % of GDP spent	*Nordic* Low % of cost financed by contributions; high % of GDP spent	*Southern* High % of cost financed by contributions; low % of GDP spent	
Korpi & Palme (1998)				
Basic security Entitlements on citizenship, flat-rate benefits	*Corporatist* Entitlements on occupation/ labour participation earnings-related benefits	*Encompassing* Entitlement on citizenship & contributions, flat-rate & earnings-related benefits		*Targeted* Eligibility on proven need; minimum benefits

Source: Soede et al (2004).

In most cases, this literature failed to address the categorisation of Eastern European welfare systems. However, the accession of most East European countries to the EU has changed this. A recent example is Menahem (2007), which presents a categorisation of European social protection systems, including the new EU Member States, based on the notion of decommodified security. Countries were compared on the basis of the ratio between social protection expenditure and employment income, penalised by the extent of people below the poverty line. This led the author to define four groups of countries, shown in Table 2.2.

Table 2.2: Categorisation of European social protection systems

Countries of the North	***Intermediate countries***	***Countries of the South***	***Central and Eastern European countries***
Sweden Netherlands Denmark Finland	Austria France Germany Czech Republic Belgium UK	Portugal Italy Greece Spain	Poland Latvia Slovakia Estonia Lithuania

Source: Menahem (2007).

Soede et al (2004), on the other hand, look at data on 85 traits of the welfare arrangements of European countries to discern clusters of countries sharing a lot of regime traits. They find five clusters (see Table 2.3): the Nordic regime with a high degree of scope of social security and a moderate extent of pensions within that; the Mediterranean regime with less extensive social security dominated by pensions; the Anglo-Saxon regime with residual pension systems but less residual social security; the Continental regime where social security is less universalistic than the Nordic regime; and the Eastern European regime lying between the Anglo-Saxon and Continental regimes. The Netherlands was deemed as being a hybrid arrangement, possibly converging towards the Scandinavian regime.

Table 2.3: Categorisation of European social protection systems – Institutional approach

Nordic regime	***Anglo-Saxon regime***	***East Europe regime***	***Continental regime***	***Mediterranean regime***
Sweden Denmark Finland	UK Ireland	Poland Hungary Slovakia Czech Rep	Austria France Germany Luxembourg Belgium	Portugal Italy Greece Spain

Source: Soede et al (2004).

Focusing more exclusively on pensions, OECD (2005) describes how cross-country analysis has typically taken three forms:

- An institutional approach – whereby the parameters of the schemes, their underlying legislation and administrative mechanisms are described or compared (e.g. the SSA's 'Social Security programmes throughout the world').
- An income-distribution approach – whereby household survey data are used to assess the income of older people (as shown in Section 1.2).
- A fiscal sustainability approach – whereby public pension expenditures are forecast (e.g. European Policy Committee (2006/09), Dang et al (2001)).

In general, representations of pension systems have used the institutional approach. World Bank (1994) set out the concept of three pension pillars: a mandatory tax-financed public programme designed to alleviate poverty, a mandatory funded, privately managed programme (based on personal savings accounts or occupational plans) for savings, and a supplementary voluntary option (through personal savings accounts or occupational plans) for people who want more protection. Categorisations of pension systems, subsequently, were according to the following dimensions: ownership/administration (public versus private), method of financing (funded versus unfunded), benefit determination structure (defined contribution [DC] versus defined benefit [DB]) and coverage (mandatory versus voluntary).

Table 2.4: Taxonomy of pension plans by EU, World Bank, ILO

	EU	*World Bank*	*ILO*
1st pillar	Publicly managed pension scheme – DB and PAYG (by payroll tax)	A relatively small (means tested, minimum pension or flat benefit), public PAYG DB	A minimum pension, universal but means tested, financed through general revenue
2nd pillar	Privately managed pension – employment-related	Private mandatory, fully funded, DC pension	Mandatory public PAYG social insurance pension
3rd pillar	Personal pension plan	Voluntary personal pension plan	Fully funded contribution scheme

Source: Kawinski & Stanko (2007).

The EU also adopted the three-pillar conception of pension systems but focused solely on the ownership/administration dimension. Thus in EU-speak, the first pillar is composed of all public-run pension programmes, the second is all schemes related to employment and/or to professional occupations, and the third pillar is constituted by all personal retirement savings

arrangements.[39] By contrast, Gillion et al (2000) indicate that the ILO focuses on the method of financing, viewing the first tier as being all mandatory Pay-As-You-Go (PAYG) programmes, the second tier as all mandatory funded tiers (irrespective if occupational or personal) and a zero tier represented by means-tested, minimum pension and/or flat rate schemes financed out of general taxation.

Another common categorisation of European pension schemes is between Bismarkian and Beveridgean systems.[40] This harks back to two different pension schemes, that introduced by Bismarck in Germany where pensions are related to employment and represent a deferred salary, and that advocated by Beveridge in the UK where pensions are meant to reduce poverty. Ferrera (1993), modifies this categorisation by focusing on the issue of coverage and broadens this distinction into universal and occupational models; the first (similar to Beveridgean) shares social risks among all citizens while in the second (similar to Bismarkian) risks are shared among the different occupational categories. Natali & Rhodes (2003), on the other hand, visualise four pension system clusters: pure occupational systems (Austria, Germany), occupational plus means-tested systems (France, Italy, Spain), universal plus means-tested systems (Netherlands, UK) and pure universal systems (Sweden).

Table 2.5: Classification of EU welfare states according to Ferrera (1993)

Occupational welfare state	***Universalist welfare state***
Pure	*Pure*
France	Finland
Belgium	Denmark
Germany	Norway
Austria	Sweden
Mixed	*Mixed*
Italy	UK
Netherlands	
Ireland	

The OECD instead adopts a taxonomy "based on the role and objective of each part of the pension system", reproduced in Table 2.6.[41] This leads to two main divisions, or 'tiers': a redistributive (or poverty-prevention) part and an insurance (or income replacement) part. The other 'tier' is voluntary provision. Within these tiers, schemes are also categorised according to their provider (public versus private) and the way benefits are accrued (DB, DC, notional defined contribution (NDC) and points systems). Schemes within the public first tier are also

[39] See Natali (2004).
[40] Bonoli (1997).
[41] The same typology is adopted in Whitehouse (2007). The OECD has developed a similar taxonomy for private pensions. See Yermo (2002).

classified according to their entitlement rules, namely whether they are resource-tested, minimum pensions or basic pensions.

Table 2.6: OECD taxonomy of pension systems in the EU

	First tier			**Second tier**	
	Universal coverage, redistributive			**Mandatory, insurance**	
	Public			**Public**	**Private**
	Resource-tested	**Basic**	**Minimum**	**Type**	
Austria	X			DB	
Belgium	X		X	DB	
Czech Rep	X	X	X	DB	
Denmark	X	X			DC
Finland			X	DB	
France	X		X	DB + Points	
Germany	X			Points	
Greece	X		X	DB	
Hungary				DB	DC
Ireland	X	X			
Italy	X			NDC	
Luxembourg	X	X	X	DB	
Netherlands		X			DB
Poland			X	NDC	DC
Portugal			X	DB	
Slovakia			X	Points	DC
Spain			X	DB	
Sweden			X	NDC	DB+DC
UK	X	X	X	DB	

Source: OECD (2007).

Some authors have focused pension taxonomies specifically on design features, mirroring the institutional tradition of cross-country comparisons. Borsch-Supan (2003), thus, distinguishes pension systems by four dimensions: credits for contributions, accrual of interest, conversion to benefit, and funding. Lindbeck (2000), by contrast, separates systems into those with exogenous and endogenous contribution rates. Table 2.7 presents a taxonomy of EU state pension systems, focusing on benefit determination features.[42] This confirms the impression that the most common model is state-run earnings-related DB. 17 EU countries have this scheme, together with another 2 who run a (very similar) points-based DB system and the Netherlands where there is quasi-mandatory DB occupational pensions. However, there has been a general shift away from this provision model over the years, with it being replaced in East Europe by personal account-based DC provision and in Western Europe by NDC or flat-rate provision. On an institutional approach, one would therefore divide Europe into three

[42] Details on these features were taken from European Commission (2007).

blocks of systems: DB, NDC and DC personal accounts, whereas up to the early 1990s there was virtually only DB.

Table 2.7: Benefit-determination taxonomy of state pension systems in the EU

	Contribution-based, Flat-rate	*Residence-based, Flat-rate*	*NDC*	*DB*	*Points*	*DC personal accounts*
Austria				X		
Belgium				X		
Greece				X		
Spain				X		
Portugal				X		
Slovenia				X		
Malta				X		
France				X	X	
Germany					X	
Romania					X	
Luxembourg	X			X		
UK	X			X		
Czech Rep	X			X		
Cyprus	X			X		
Lithuania	X			X		X
Bulgaria				X		X
Hungary				X		X
Ireland	X					
Finland		X		X		
Netherlands		X		X		
Estonia		X		X		X
Denmark		X				X
Sweden		X	X			X
Poland			X			X
Latvia			X			X
Italy			X			

Note: Many countries are in some form of transition due to reforms, or to partial maturation of schemes. For classification purposes only rules as apply to new labour market entrants were considered. Only mandatory/quasi-mandatory provision was taken into account.
Source: Own analysis using information in European Commission (2007).

2.2 An alternative approach of categorising pension systems

The previous section showed how existing pension categorisations focus on system design features. However, this approach, while quite useful, has a number of shortcomings. Most pension systems have been reformed extensively and the process seems to be accelerating across Europe,[43] making it hard to classify countries. For instance, both Sweden and Italy have reformed their systems for new workers from PAYG-DB to NDC, but existing pensions are still determined by the previous rules. Similarly there are hardly any personal account pension

[43] Chapter 3 will discuss in more detail these changes.

recipients in Eastern Europe. Moreover pension systems in many countries are still not mature and different cohorts of pensioners are benefiting from different schemes. Thus, most pensioners in Cyprus and Malta are still getting the bulk of their income from flat-rate schemes, while dependence on earnings-related state pensions in the UK varies significantly.

Secondly, the reforms, themselves, suggest that what really matters when looking at systems is whether they are achieving their aims in an acceptable way for society. While there might be some bureaucratic tendency to maintain systems unchanged, most governments would change their pension systems if these are seen as not fulfilling their objectives, or when they are seen as consuming too many resources. Thus a more long-serving categorisation of pension systems, rather than looking at design features, needs to concentrate on the aims of pension systems and the costs incurred. This would integrate the income-distribution and fiscal sustainability approaches to cross-country pension system analysis mentioned earlier.

In this light, one can attempt to categorise pension systems according to their outcomes compared to the EU25 average. Three dimensions seem particularly appropriate – spending outlays (the financial constraint), the relative income of the 65+ compared to the working age population (the income replacement aim), and the poverty rate among the 65+ (the poverty alleviation aim). These represent three dimensions against which pension systems are usually assessed and which usually lead to reform pressures. In contrast to institutional features, these dimensions do not tend to change that much. It is hard to have a country that passes from being a very high spender to a very low spender in a short time. Similarly for the other two dimensions, it is difficult to have countries where the situation changes dramatically from one year to the next. Even if reforms are taking place, these will take a lot of time to have a distinctive impact on these three dimensions. Thus, this categorisation would be less arbitrary and more long-serving than the institutional approaches described previously.

This approach also has the benefit of being multi-dimensional, providing more comprehensive information on the different systems. Being based on quantitative data comparisons, this approach makes it easier to understand the extent of differences among countries, particularly those with the same institutional features. Thus, despite both having a DB system, the UK would be a low spender on pensions since the state spends just 6.6% of GDP on pensions, compared to the 10.4% EU average, while Austria qualifies as a high spender with 13.1% of GDP. This approach limits the possibility of countries being categorised differently, and reduces the somewhat confusing picture that emerges from the studies described in Section 2.1

2.21 The financial cost dimension

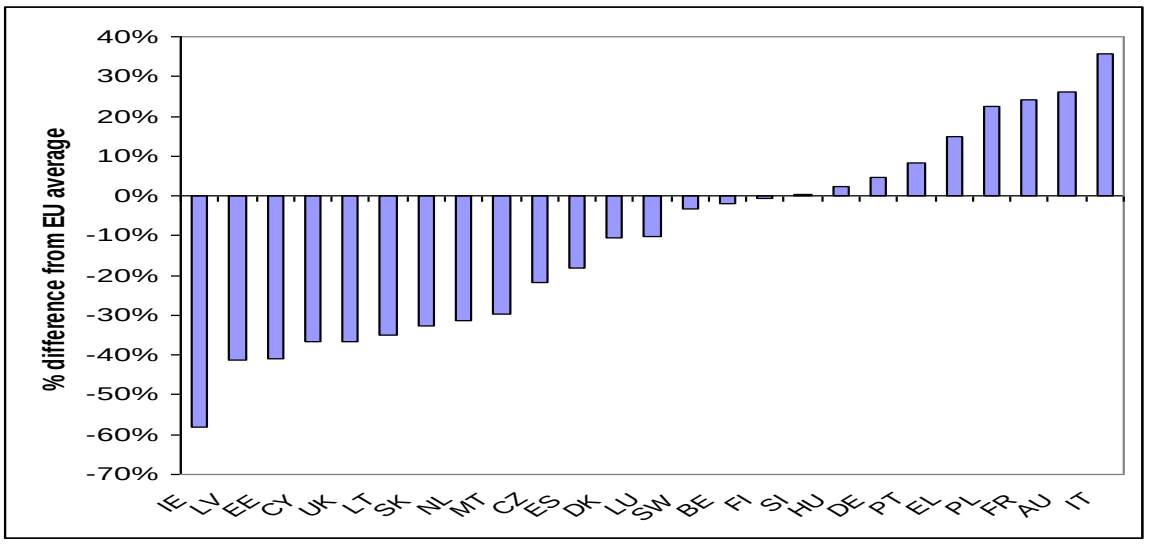
Data on pension spending indicate a wide variation among countries (shown in Table 2.8 and Figure 2.1), with seven countries showing relatively high spending. These include three Southern European countries, three Continental countries and Poland. Amongst the low spenders, one finds Ireland and the UK, and also former UK colonies, Cyprus and Malta. The Baltic States are also squarely in this category, together with the Czech Republic and Slovakia. Spending on pensions is also relatively low in Denmark and the Netherlands, which both operate flat-rate schemes (like the UK, but with a more universal entitlement).

Table 2.8: Low vs. High Spenders (by size of difference from EU25 Average)

High	Average*	Low
Italy (IT)	Hungary (HU)	Ireland (IE)
Poland (PL)	Slovenia (SI)	Latvia (LV)
Austria (AU)	Finland (FI)	Estonia (EE)
France (FR)	Belgium (BE)	Cyprus (CY)
Greece (EL)	Sweden (SW)	UK
Portugal (PT)		Lithuania (LT)
Germany (DE)		Slovakia (SK)
		Netherlands (NL)
		Malta (MT)
		Czech Rep (CZ)
		Spain (ES)
		Denmark (DK)
		Luxembourg (LU)

** Average in a range of +/- half percentage point of GDP in spending from EU25 average*

Figure 2.1: Difference between national spending on pensions and the EU25 level

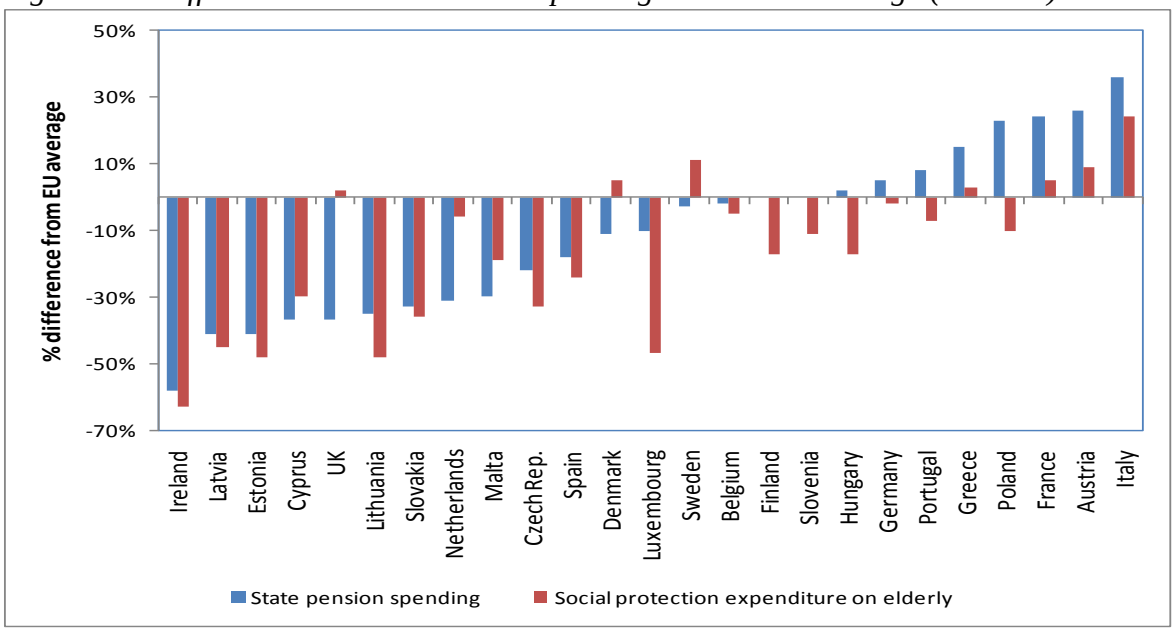


Source: Own analysis of EPC data on spending on state pensions (2005-07).

One might argue that just looking at state spending is misleading as the public/private mix of provision differs. Figure 2.2 compares the differences from the EU-average of spending

on state pensions and of social protection expenditure on elderly people. The latter also captures other state benefits to the elderly and income from occupational pensions.[44] While there are some differences in the magnitude of differences between the two indicators, particularly for the UK and the Netherlands, the categorisation remains similar.

Figure 2.2: Differences between national spending and the EU-average (2005-07)

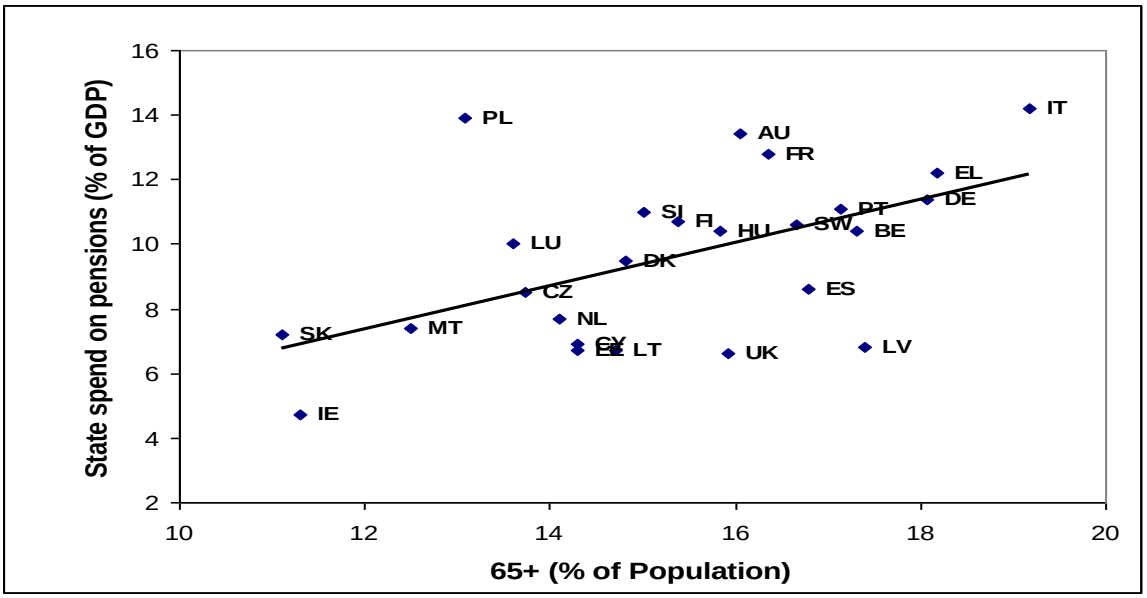


Note: Countries arranged in order of the size of the gap in their spending on state pensions.
Source: Own analysis using Eurostat data (2005-07).

Another issue to consider when looking at this dimension is the relation between the size of pension outlays and the demographic structure. Countries with a higher proportion of elderly people will spend more on pensions than younger countries, irrespective of the type of pension system. Figure 2.3 plots the positive relationship between state spending on the elderly (% of GDP) and the share of the 65+ population in the EU25. It is evident that the latter is not the sole determinant of the financial burden of pension provision, with a number of countries showing particularly strong deviation from the average relationship.[45] The Baltic States, UK, Cyprus, Ireland and Spain spend much less, while Italy, Austria, Poland, France, Slovenia and Luxembourg appear to be spending much more. If one were to look at social protection expenditure (instead of state spending on pensions), the position of the Netherlands and the UK as low spenders would turn into being that of an average spender.

[44] Eurostat express concern on their data's coverage of the Irish occupational sector.
[45] Note that Eurostat data suggest that in many countries the share of pensioners exceeds by far that of the 65+ in the population. For instance in Germany pension beneficiaries stood at 27% of the population in 2004, compared to the 18% aged 65+. Even larger differences exist in Italy and Eastern European countries.

Figure 2.3: Relationship between pension spending and size of 65+ population



Source: Own analysis of Eurostat data on spending on pensions and population (2005).

2.22 The income replacement dimension

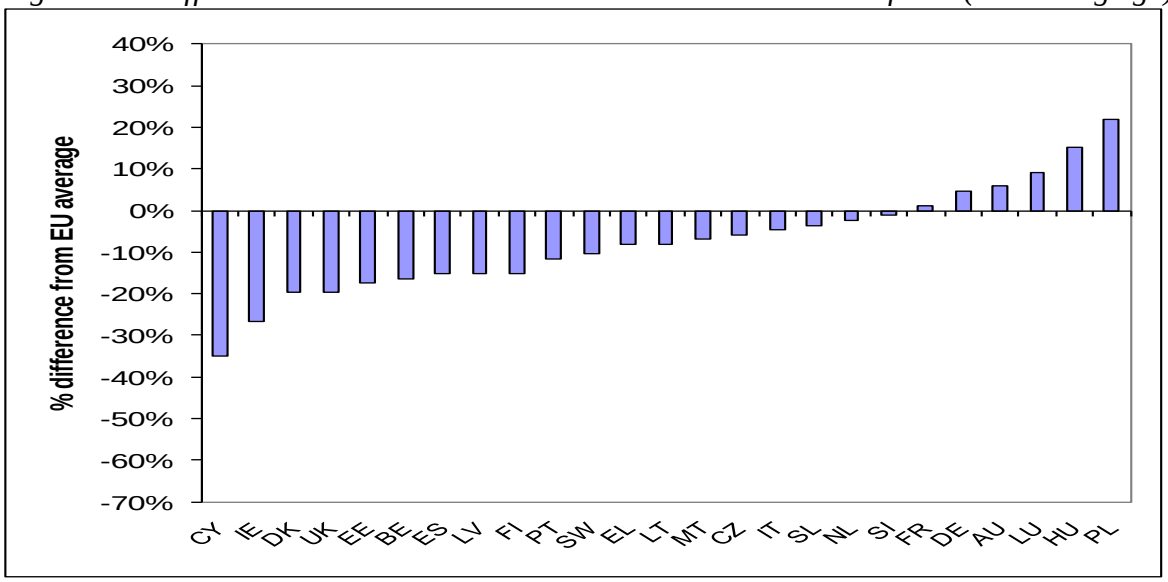
Income replacement during retirement is one of the twin aims of pension systems. However the importance countries attach to it differs, particularly whether this role needs to be fulfilled by the state. Looking at the relative income ratio of the 65+ to that of the working age population, depicted in Table 2.9 and Figure 2.4, one notes a great deal of variation, though the dispersion is lower than that observed in state pension outlays. Poland has the highest relative value, with the 65+ enjoying higher incomes than their working-age counterparts. A close second is Hungary. On the opposite side of the spectrum one finds Cyprus, Ireland, Denmark and the UK, with relatively low relative income ratios among the elderly.

Table 2.9: Low vs. High Income replacement (by difference from EU25 Average)

High	Average*	Low
Poland (PL)	France (FR)	Cyprus (CY)
Hungary (HU)	Slovenia (SI)	Ireland (IE)
Luxembourg (LU)	Netherlands (NL)	UK
Austria (AU)	Slovakia (SK)	Denmark (DK)
Germany (DE)	Italy (IT)	Estonia (EE)
	Czech Rep (CZ)	Belgium (BE)
	Malta (MT)	Latvia (LV)
		Spain (ES)
		Finland (FI)
		Portugal (PT)
		Sweden (SW)
		Lithuania (LT)
		Greece (EL)

** Average within a range of +/- 5 percentage points from the EU25 average*

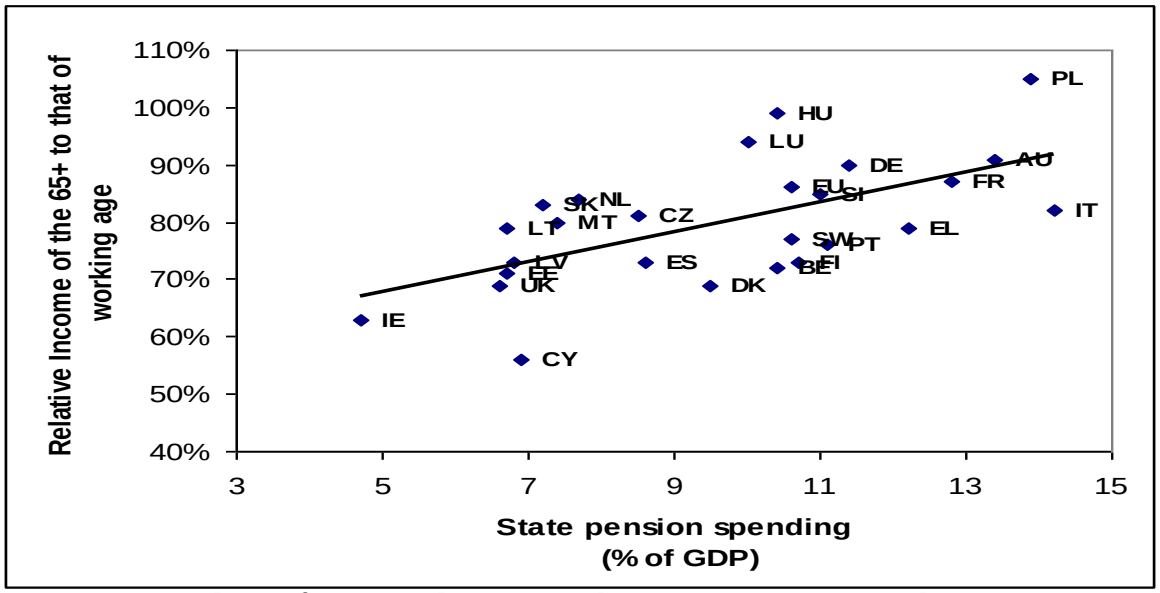
Figure 2.4: Difference between National and EU25 Relative Income of 65+ (to working age)



Source: Own analysis of EU-SILC (2005-07).

Figure 2.5 illustrates the positive relationship between the relative income ratios of the elderly and the percentage of GDP spent on state pensions. Poland with the second-highest expenditure has the highest relative income ratio, while Ireland the lowest state spender reports the second-lowest. However, this relationship, though statistically significant, explains only a small part in the variation. For example, despite the highest percentage of GDP spent on state pensions, Italian elderly people have below-average relative income. Other factors are at play, particularly when looking at women's relative incomes the relationship is weaker.[46]

Figure 2.5: Relationship between state pension spending and relative income levels

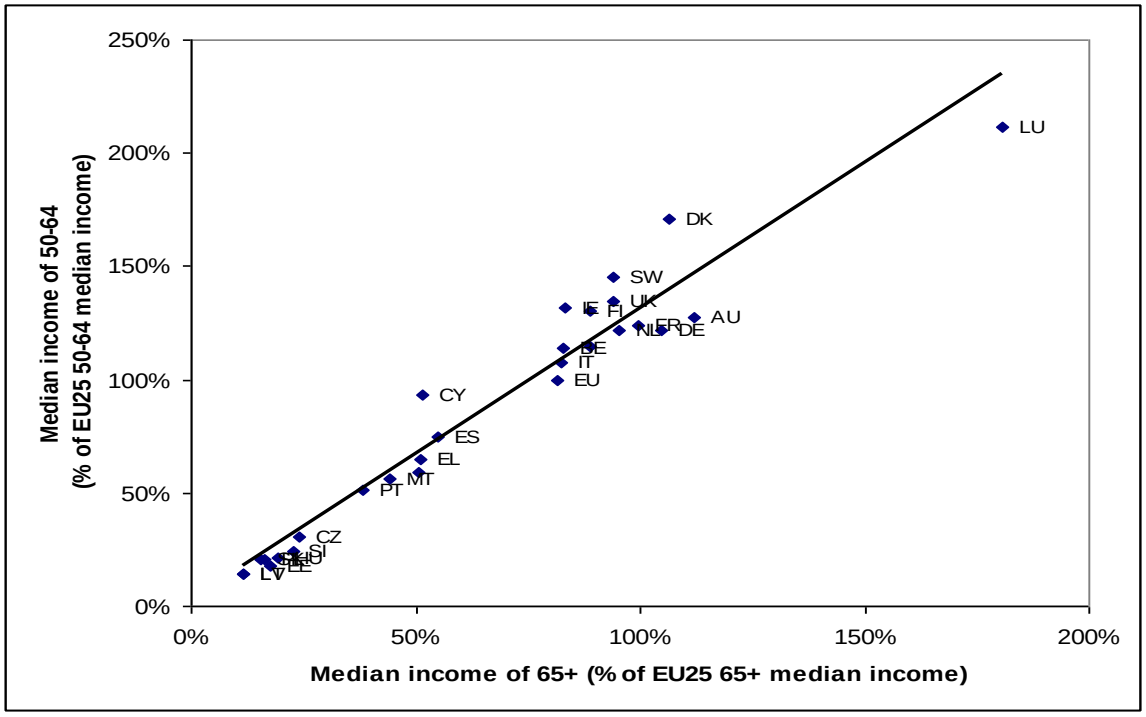


Source: Own analysis of Eurostat data on spending on state pensions and EU-SILC (2005).

[46] Given women's lower labour market participation, and the fact that many state pension schemes are earnings-related, a more generous level of state spending on pensions is less likely to benefit women.

To further assess the relative strength of the income smoothing function across countries, Figure 2.6 plots the national median income for those aged between 50 and 64 in terms of the EU25 average for that age bracket against the national median income for those aged 65+ expressed in relation to the EU25 average. Figure 2.6 shows there is a very strong positive relationship.[47] However there is a considerable variation in the degree to which older people in some countries maintain their relative living standards. For instance, while the average 50-64 person in Denmark has a median income which is 171% of the EU25 average for that same age group, the average 65+ Dane has a median income which is 131% of the EU25 average 65+ person. Figure 2.6 suggests that the 65+ in Scandinavian countries, Ireland, Cyprus and the UK do not manage to keep up with their 50-64 counterparts to a larger extent than the EU25 average.[48] By contrast, those in Luxembourg, Austria and Germany (amongst others) appear to manage the transition significantly better.

Figure 2.6: Income as a % of the EU average for the 50-64 and 65+ age groups



Source: Own analysis of EU-SILC (2005).

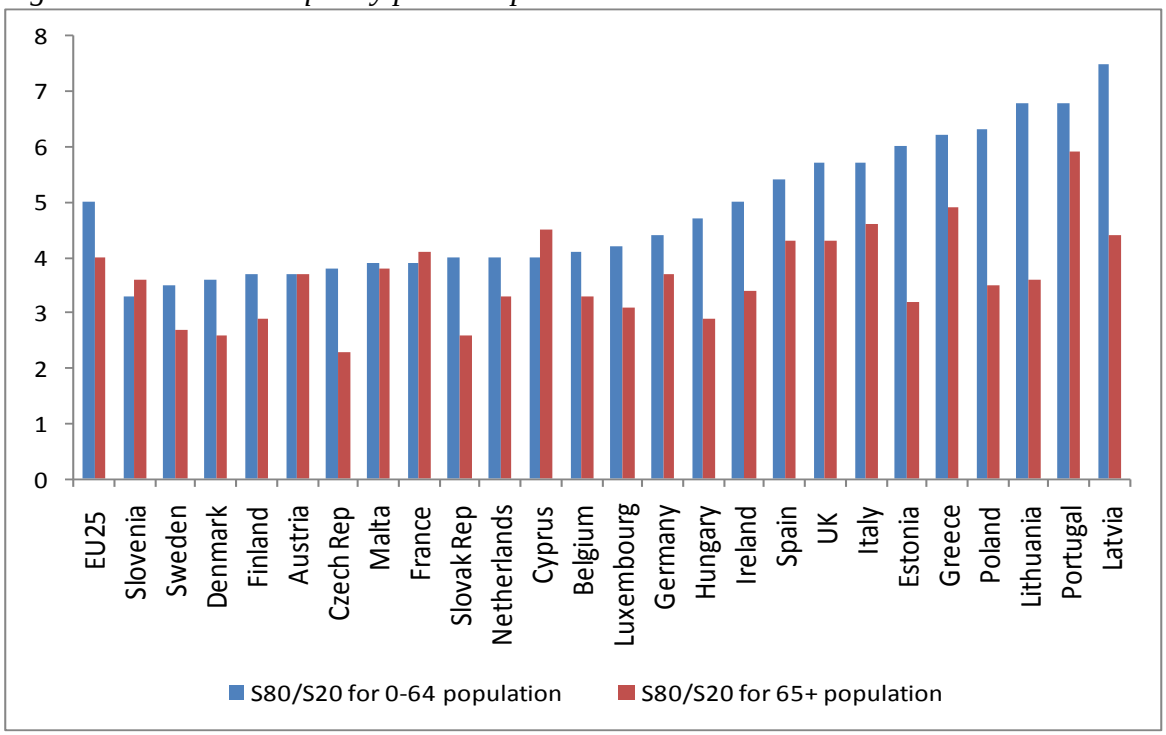
The influence of pension systems can also be grasped by looking at Figure 2.7, which presents EU-SILC data on the degree of income inequality among the population aged 0-64 and that aged 65+ in the EU25. On an EU-wide basis, the gap between the incomes of the top

[47] The R-squared in this linear relationship is 94%

[48] In countries above the trend line, the relationship between the income of the 50-64 and that of the 65+ is smaller than the average across all EU25 countries, and vice versa.

and the bottom quintile in older cohorts is substantially lower than that found among the rest of the population. This is particularly true in Eastern European countries, where the degree of income inequality among the 65+ population falls below that found in the old Member States, despite that it is significantly higher when one focuses on just the 0-64 population. The UK and Ireland, with their flat-rate systems, also manage to reduce income inequalities significantly. A similar effect can be observed in Sweden and Denmark. By contrast in France, Slovenia and Cyprus, income inequality is higher among the 65+ population than it is among the rest of the population.

*Figure 2.7: Income inequality pre- and post-65**



** The ratio of equivalised disposable income received by the 20% of the population with the highest income to that received by the 20% of the population with the lowest income.*
Note: Countries organised in order of inequality for 0-64 population.
Source: Own analysis using EU-SILC (2005-07).

2.23 The poverty prevention dimension

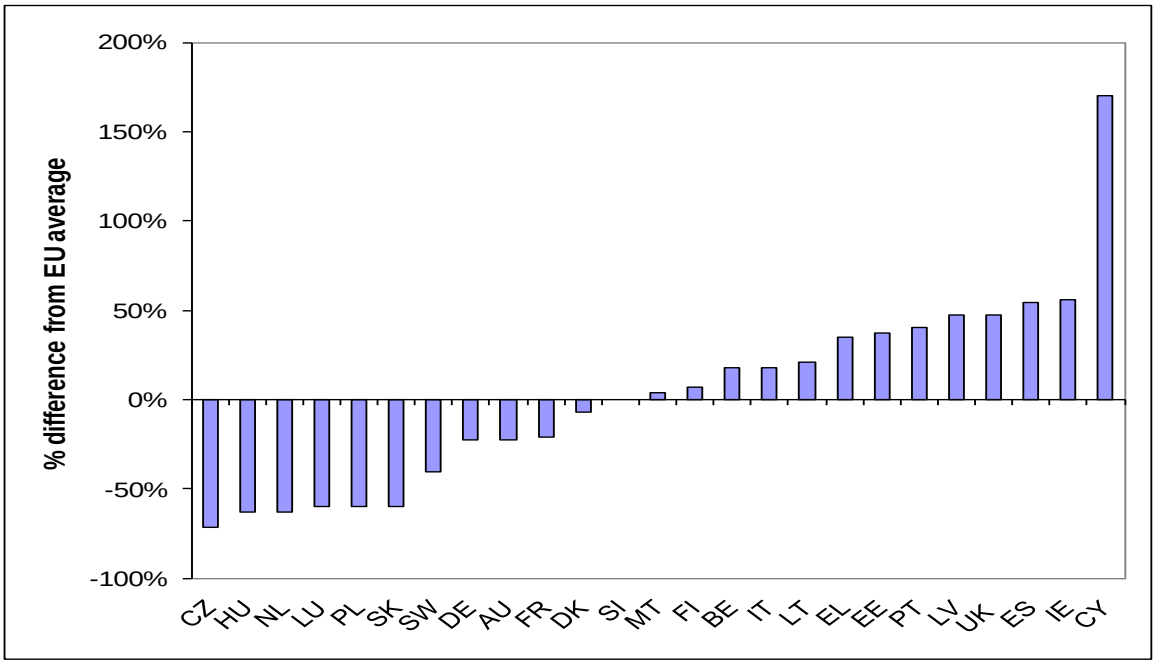
The third categorisation dimension we look at is how countries compare against the EU average in their pension system's ability to prevent poverty among the 65+ population. The variation in this aspect is very pronounced, as can be seen in Table 2.10 and Figure 2.8. While the Czech Republic and the Netherlands have a poverty rate amounting to around a quarter of the EU25 average, the poverty rate among the 65+ in Cyprus is two and a half times that in the EU.

Table 2.10: Low vs. High Poverty Rates (by size of difference from EU25 Average)

High	Average	Low
Cyprus (CY)	Italy (IT)	Czech Rep (CZ)
Ireland (IE)	Belgium (BE)	Hungary (HU)
Spain (ES)	Finland (FI)	Netherlands (NL)
UK	Malta (MT)	Luxembourg (LU)
Latvia (LV)	Denmark (DK)	Poland (PL)
Portugal (PT)	Slovenia (SI)	Slovakia (SK)
Estonia (EE)		Sweden (SW)
Greece (EL)		Germany (DE)
Lithuania (LT)		Austria (AU)
		France (FR)

** Average within a range of +/- 4 percentage points from the EU25 average*

Figure 2.8: Difference between National Poverty Rate of the 65+ and the EU25 level



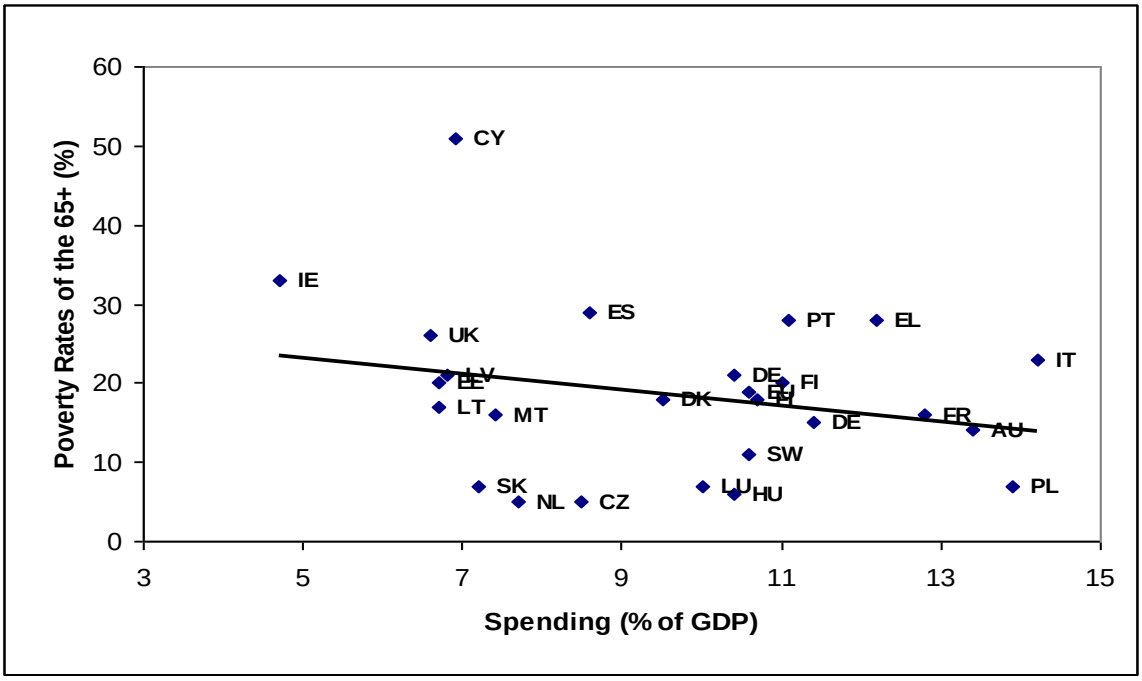
Source: Own analysis of EU-SILC (2005-07).

This variation is driven by a number of factors, which have an impact on the generosity and coverage of pension systems. Thus countries with low female labour participation tend to have high poverty rates,[49] while the Anglo-Saxon countries with their unequally spread private pension systems also score badly. By contrast, poverty rates are relatively lower in Eastern European states (with a tradition of high female labour participation and where working-age individuals experienced stronger income shocks during the transition to the market system) and the Netherlands and Sweden, both characterised by quasi-mandatory occupational pension provision.

[49] The only exceptions being Poland and Malta.

Interestingly there appears to be only a weak correlation between the level of state pension spending and the poverty rates among the 65+ population.[50] Looking at Figure 2.9, it is evident that spending a lot does not ensure poverty prevention. For instance, the top achievers in poverty prevention, the Netherlands and the Czech Republic, spend less than the EU25 average on state pensions. By contrast, while Poland and Italy spend a similar share of their GDP on state pensions, the poverty rate among the 65+ population in Italy is more than three times higher than that in Poland.

Figure 2.9: Relationship between state pension spending and poverty rates of the 65+



Source: Own analysis of Eurostat data on pension spending and EU-SILC for 2005.

There appear to be clear differences among countries on how effective they are at preventing poverty with the same levels of spending. O'Connor (2005) reports "a very high correlation between percentage change in at-risk-of-poverty after social transfers and GDP per capita standardised for purchasing power standards…and also between social protection expenditure and GDP per capita when both are standardised for purchasing-power standards". However there are differences in the "efficiency" of how much a country spends to achieve a given change in its at-risk-of-poverty rates, as shown in Table 2.11. This reveals that South European countries tend to spend a lot per capita on social protection to achieve changes in poverty rates, in contrast with Scandinavian countries, the UK and Ireland.

[50] The R-squared of this linear relationship is just 6%.

Table 2.11: The 'efficiency' of social protection expenditure (2001)

	Expenditure per capita for each p.p. of change in risk-of-poverty		*Expenditure per capita for each one % of change in risk-of-poverty*
EU15	**711.7**	**EU15**	**170.8**
Sweden	416.8	Sweden	112.5
Ireland	430.6	Denmark	125.7
Denmark	433.6	Ireland	129.2
UK	515.1	Finland	133.5
Belgium	688.8	UK	149.4
Finland	702.8	Germany	153.9
Germany	732.9	Netherlands	155.2
Netherlands	739.2	Belgium	158.4
Austria	746.4	Austria	164.2
France	807.3	France	193.8
Portugal	911.0	Portugal	218.6
Luxembourg	959.9	Luxembourg	220.8
Spain	966.8	Spain	222.4
Greece	1323.7	Greece	304.4
Italy	2062.0	Italy	453.6

Source: Adapted from O'Connor (2005). Data in Euros in purchasing power parities.

Table 2.12 presents this analysis carried out on pension expenditure. The position of Italy, Portugal and Greece remains similar, Scandinavian countries and Ireland remain among the better performers, while the UK's 'efficiency' declines significantly.

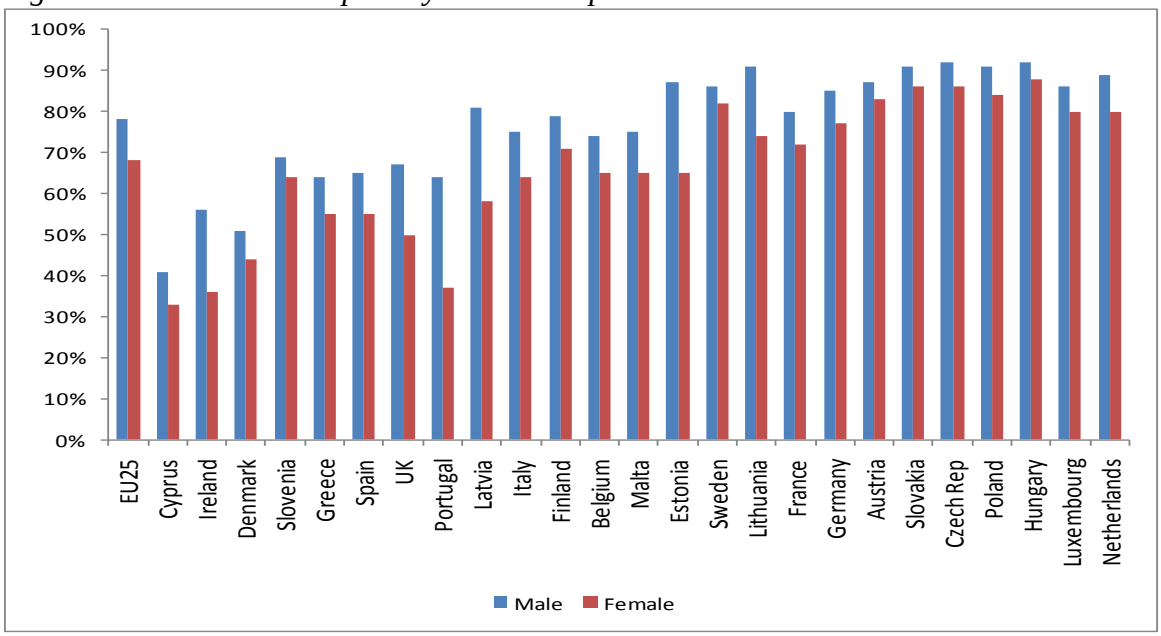
Table 2.12: The 'efficiency' of pension expenditure (2001)

	pp reduction in poverty for each pp of GDP spent on pensions		*% reduction in poverty for each pp of GDP spent on pensions*
EU15	**5.4**	**EU15**	**6.3**
Greece	3.6	Greece	4.5
Portugal	4.0	Austria	5.0
Austria	4.2	Italy	5.4
Italy	4.4	Portugal	5.5
Spain	5.2	UK	6.0
UK	5.5	Belgium	6.3
Germany	5.6	Germany	6.6
Belgium	5.8	Denmark	6.8
Denmark	5.9	France	6.9
France	6.5	Sweden	7.0
Sweden	6.6	Spain	7.3
Finland	6.8	Netherlands	7.4
Netherlands	6.8	Finland	7.4
Luxembourg	8.0	Luxembourg	9.1
Ireland	8.9	Ireland	11.6

Source: Own analysis of Eurostat data on spending and risk-of-poverty.

One key consideration affecting this efficiency appears to be the coverage of pension systems. As can be seen in Figure 2.10, in some countries, such as Portugal and Ireland, pension transfers have much weaker poverty reduction impacts among women.

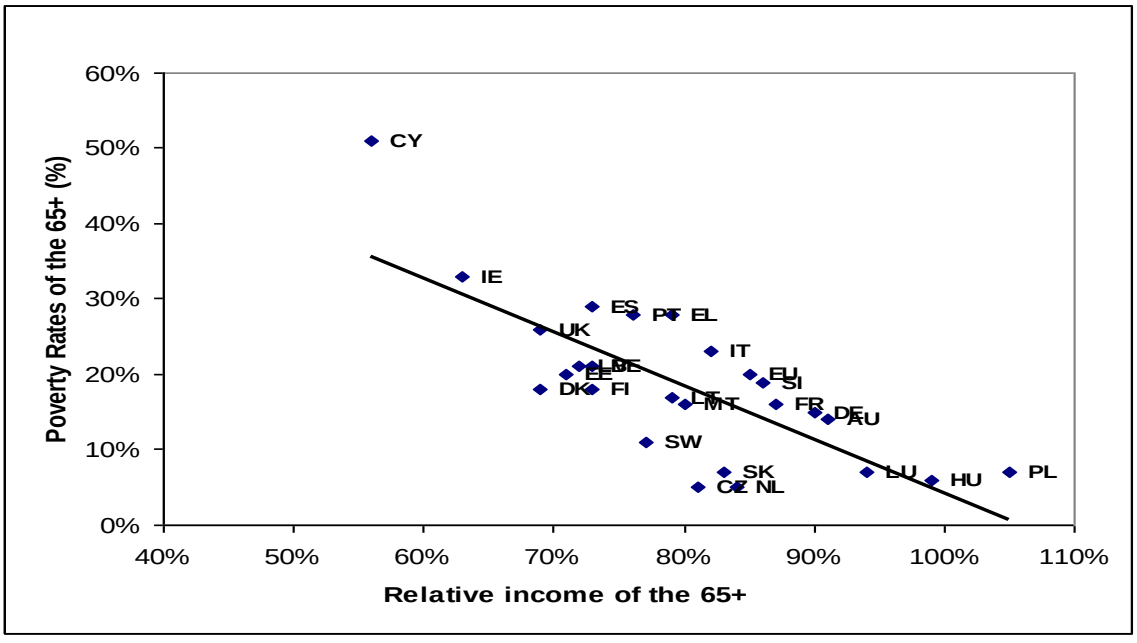
*Figure 2.10: Reduction in poverty risk due to pensions**



**The difference in the risk-of-poverty for the 65+ population with pension income included and excluded, expressed as a percentage of the risk-of-poverty with pensions excluded. Countries arranged by the size of the drop in poverty risk for the total 65+ population.*
Source: Own analysis using EU-SILC (2005).

Conversely Figure 2.11 depicts a strong inverse relation between relative income levels and poverty. Countries where older people, on average, have an income level close to that of the working age population tend to have lower poverty rates. The goals of income replacement and poverty prevention appear to have some degree of synergy.

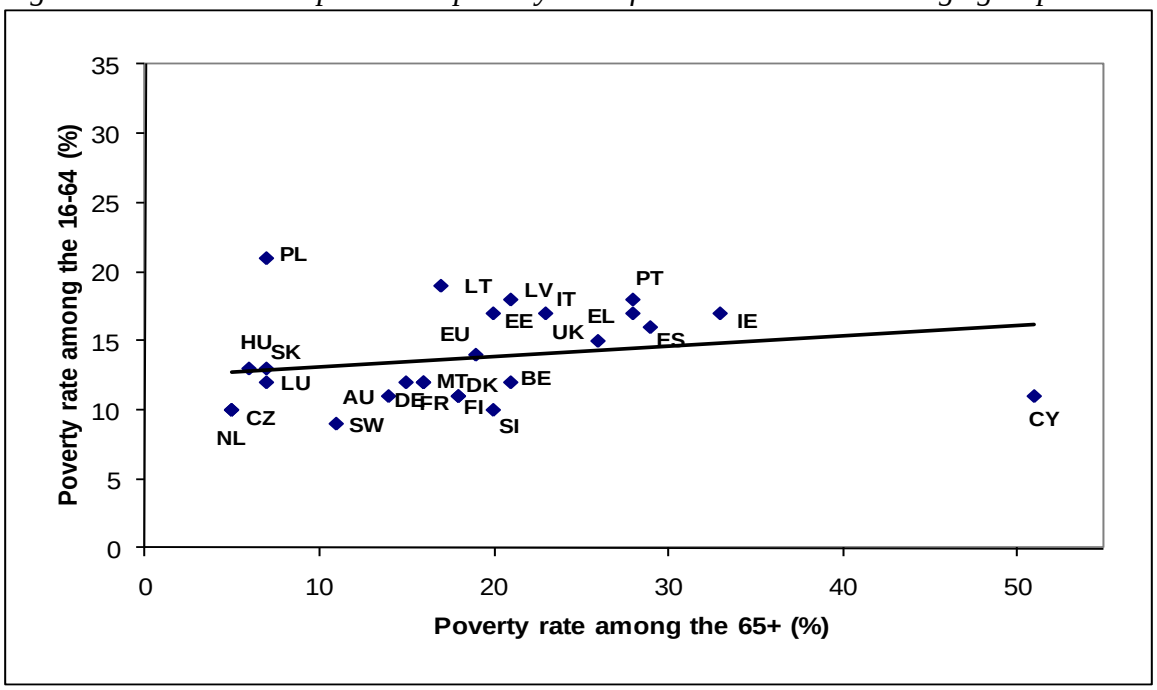
Figure 2.11: Relationship between relative income and poverty rates



Source: Own analysis of EU-SILC (2005).

Nonetheless, pension transfers and their generosity, are clear determinants of cross-country differences in poverty rates among older people. Figure 2.12 indicates that cross-country differences in poverty rates for older ages do not appear to be statistically related to differences for those of working-age.

Figure 2.12: Relationship between poverty rates for the 16-64 and 65+ age groups



Source: Own analysis of EU-SILC (2005).

2.3 A three-dimension categorisation of pension systems

The previous section showed how countries differ along three dimensions. It has also shown how there is a clear synergy between spending and income replacement, and also between income replacement and poverty rates. With this in mind, EU25 countries were allocated to two different categories: high and low,[51] in these three dimensions, in order to better understand the interaction of these outcomes. The categorisation scheme, presented in Table 2.13, gives rise to eight different combinations. However two of these were not peopled. In particular, countries with high replacement do not have high poverty, as implied by the statistical relationship described previously.[52] The other empty category was the high spending, low replacement and low poverty category.[53]

[51] To simplify matters, countries tending towards the EU25 average were allocated in these categories.
[52] This removes the possibility of having countries with high spending, high replacement and high poverty and countries with low spending, high replacement and high poverty.
[53] Sweden and Finland spend slightly higher than the average, but were treated as low spenders.

Table 2.13: Categorisation of countries by pension system outcomes

	Pension spending compared to EU25	*Relative income 65+ compared to EU25*	*Poverty 65+ compared to EU25*
Group A: Systems with high replacement and low poverty			
Category 1: Systems with high replacement and very low poverty			
Hungary	**+2%**	**+15%**	**-63%**
Poland	**+23%**	**+22%**	**-60%**
Luxembourg	**-10%**	**+9%**	**-60%**
Category 2: Systems with high replacement and low poverty			
Austria	**+26%**	**+6%**	**-23%**
Germany	**+5%**	**+5%**	**-23%**
France	**+24%**	**+1%**	**-21%**
Group B: Systems with low replacement and high poverty			
Category 3: Low spending, low replacement, high poverty			
Ireland	**-58%**	**-27%**	**+56%**
Estonia	**-41%**	**-17%**	**+37%**
UK	**-37%**	**-20%**	**+47%**
Cyprus	**-37%**	**-35%**	**+170%**
Lithuania	**-35%**	**-8%**	**+21%**
Latvia	**-35%**	**-15%**	**+47%**
Spain	**-18%**	**-15%**	**+54%**
Belgium	**-2%**	**-16%**	**+18%**
Category 4: High spending, low replacement, high poverty			
Slovenia	**0%**	**-1%**	**0%**
Portugal	**+8%**	**-12%**	**+40%**
Greece	**+15%**	**-8%**	**+35%**
Italy	**+36%**	**-5%**	**+18%**
Group C: Systems with low replacement and low poverty			
Category 5: Systems with low replacement and low poverty			
Malta	**-30%**	**-7%**	**+4%**
Czech Rep.	**-22%**	**-6%**	**-72%**
Slovakia	**-33%**	**-3%**	**-60%**
Netherlands	**-31%**	**-2%**	**-63%**
Category 6: Systems with very low replacement and low poverty			
Sweden	**-3%**	**-10%**	**-40%**
Finland	**0%**	**-15%**	**+7%**
Denmark	**-11%**	**-20%**	**-7%**

High spending	**High replacement**	**Low poverty**
Low spending	**Low replacement**	**High poverty**

Note: Countries arranged in Group A in order of the difference in poverty rates from the EU average. Countries arranged in Group B in order of the difference in spending on state pensions. Countries arranged in Group C in order of the size of their replacement function.

2.31 Group A: Systems with high replacement and low poverty

The first group of countries is characterised by high relative income and low poverty, but currently differ as regards state spending outcomes.

Category 1: Low to high spending, high replacement, very low poverty

Luxembourg, Poland, Hungary

Category 2: High spending, high replacement, low poverty

Austria, Germany, France

Luxembourg and Hungary manage to achieve the goals of high income replacement and low poverty without spending very large amounts of their GDP on pensions. However both countries might eventually spend a lot more than the EU average.[54] Both, in fact, spend more than their share of the 65+ would imply from a European perspective (see Figure 2.3). The other countries placed in this Group - those usually classified as having Continental (or Bismarkian) systems, together with Poland - manage to achieve both high income replacement and low poverty among the 65+ population, but at the cost of having higher-than-average spending outlays.

2.32 Group B: Systems with low replacement and high poverty

The second group of countries is characterised by higher-than-average poverty rates and by low relative income levels. However there is a clear distinction in the level of spending.

Category 3: Low spending, low replacement, high poverty

Ireland, UK, *Estonia*, Latvia, Lithuania, Cyprus, *Spain*, *Belgium*

Category 4: High spending, low replacement, high poverty

Slovenia, Portugal, Greece, Italy

The countries in the first category of this group, in fact, achieve this state in conjunction with low state spending on pensions, while the others are characterised by high public spending on pensions. Among the low spenders one finds the Anglo-Saxon duo - the UK and Ireland, together with an ex-colony Cyprus. There are also the Baltic countries, though the classification of Estonia in this category is a bit debatable as it is only recently that

[54] Projections made in Economic Policy Committee (2009) indicate that Luxembourg and Hungary will be spending 13% and 22% of GDP on pensions, respectively, by 2050, as against 12% in the EU25.

its poverty rate has started to exceed the EU25 average, and one could place this country among those of Group C. Spain and Belgium, while they are quite similar to the Mediterranean countries which mainly compose the second category of this group, currently has relatively low pension spending, but fiscal projections imply that this will no longer be the case over the next decades. One could therefore place them within Category 4. The other country in this category, Slovenia, is particularly difficult to categorise, since it close to the EU25 average in all three dimensions. Looking at recent trends, its poverty rate has remained stable despite an increase across the EU25, while pension spending is on the rise.[55] Its degree of income replacement is also only slightly below the EU25 average. On the basis of these considerations, one might consider categorising Slovenia in Group A.

2.33 Group C: Systems with low replacement and low poverty

The last group of countries achieves low poverty and low state spending on pensions, but its 65+ populations enjoy proportionally lower relative incomes than their working age counterparts. However there is a clear distinction in the level of replacement.

Category 5: Low spending, low replacement, low poverty

Malta, Czech Republic, Slovakia, *Netherlands*

Category 6: Low spending, very low replacement, low poverty

Sweden, Finland, Denmark

The Scandinavian countries are more focused (and successful) on poverty prevention than on income replacement.[56] In the other countries of Group C, though still limited, the replacement function is not so constrained. Thus in the Czech Republic and Slovakia the level of relative income is not that much below the EU25 average. So they could be considered as being closer to Group A. However, in all three cases, state spending is quite modest by EU25 standards, and the relative generosity of social protection expenditure on the elderly is significantly below average. Moreover, Figure 2.3 suggests that they spend less than their share of the 65+ population would imply. Similar considerations can be made for the only non-Social Democratic country in this group, Malta.

[55] Figure 3 indicates that it spends more than its share of 65+ population would imply on a EU-wide basis.
[56] Figure 2.6 showed a significant decline in the relative income of their 65+ population compared to their 50-64 population.

The position of the Netherlands, on the other hand, is less clear – in that if one considers its quasi-mandatory occupational pensions, its level of spending is above the EU25 average. Moreover the relative income ratio for its 65+ population is only slightly below the EU25 average and the relative generosity of its social protection expenditure is above-average. One could very easily re-categorise the Netherlands into Group A.

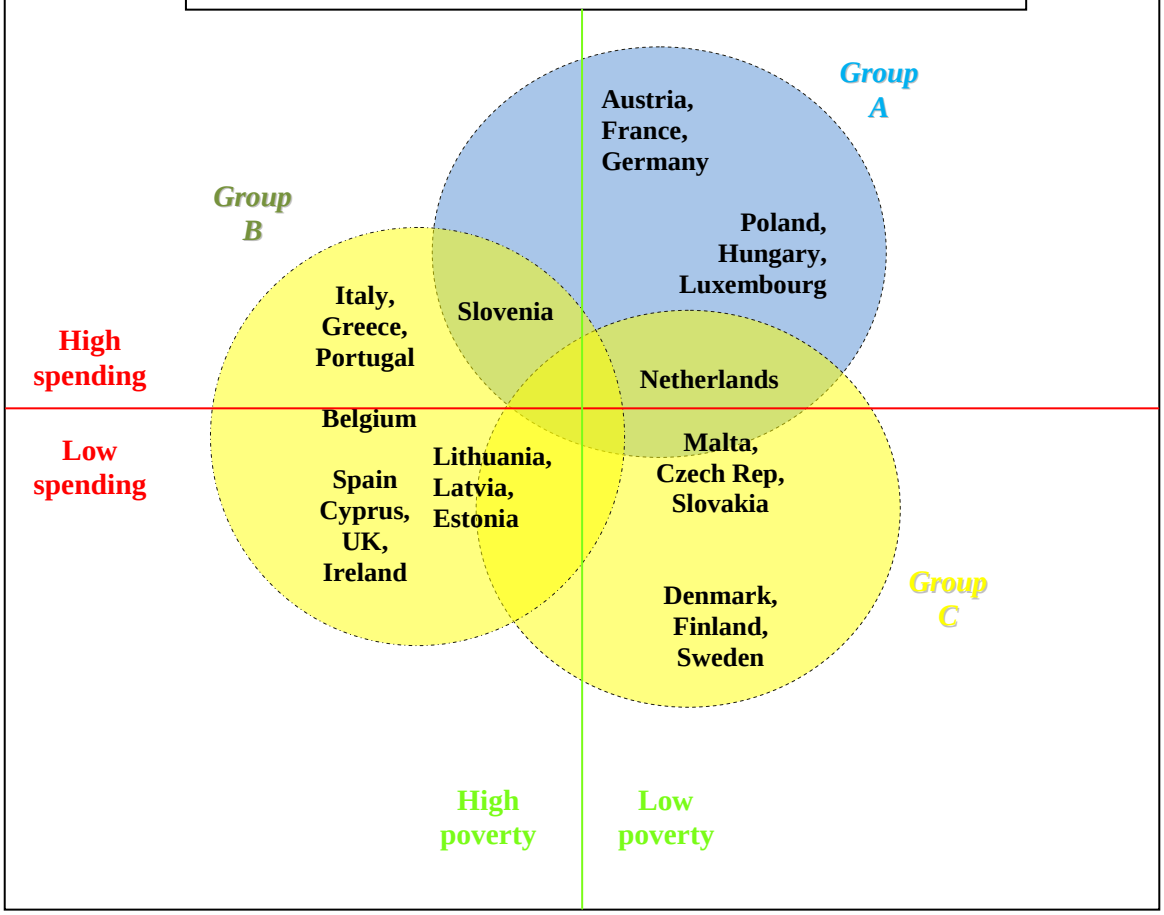
2.34 Three-dimension categorisation of pension systems

Figure 2.13 presents the categorisation of EU pension systems along the dimensions of state pension spending, income replacement and poverty among the 65+. The three groups have been set out as three intersecting circles. Since countries in both Group B and Group C are characterised by low replacement rates, their circles are of the same colour. The three circles were, in turn, split into high and low spenders by means of a dividing red horizontal line, and into countries with high and low poverty by means of a dividing green vertical line. Finally those countries, where classification is debatable, have been placed at the intersections.[57]

Within each broad group there are at least two sub-groups, but only in Group B is the division strong enough to merit close attention. In Group B, the Mediterranean countries (and Belgium) are clearly distinguished from Ireland, Cyprus and the UK on account of their higher spending. Slovenia, as was argued above, seems to be converging to Group A, while the Baltic states which were closer to Group C in the past, are now moving more towards Group B as their pensioner poverty is rising. Within Group A, the distinction between the two groups comprising the old continental Member States and the new continental Member States (and Luxembourg) is mainly in the degree of success in poverty alleviation (with the new Member States and Luxembourg further to the left of the 'green' poverty line), as differences in spending between these countries seem to be disappearing. By contrast in Group C, the main differences are in the degree of income replacement, with new Member States dissimilar from the Scandinavians, in that their replacement rates are higher (which is why these countries are placed closer to the blue circle denoting the high replacement rates evident in countries of Group A). The Netherlands, on the other hand, is placed clearly in the intersection between Groups A and C, as replacement rates are converging to the EU average, while taking account of quasi-mandatory occupational pension provision implies a much higher level of spending.

[57] It is interesting to note that, with the possible exceptions of Poland and Cyprus, the position of the new Member States within this categorisation is problematic. This may reflect either the fact that these countries have relatively immature pension systems (e.g. Malta) or else that they are still in transition from very different pension systems (e.g. Estonia, Latvia).

Figure 2.13: Three-dimension pension system categorisation



Note: Groups B and C are coloured in yellow, as countries in these groups have low replacement rates; while those in Group A have high replacement rates. Countries placed above the horizontal line are high spenders, while those placed to the left of the vertical line have higher-than-average poverty.

When one compares this categorisation with the ones discussed in Section 2.1, one notes several differences. The main one is that whereas the standard institutional classifications give the impression of very distant and well-defined groups of countries, this quantitative approach suggests distinctions are not that clear and that certain countries are clearly in transition. While it tends to confirm the usual grouping of Scandinavian, Mediterranean, Anglo-Saxon and Continental systems, it also indicates that there are clear differences among these countries. It also indicates the presence of several countries which cannot be neatly classified. In the case of Eastern European Member States, this may reflect the fact that pension systems have changed substantially and economies are still being affected by the transition from socialist systems. Rather than having three clearly defined 'worlds of welfare' as suggested by Esping-Andersen or two broad scope categorisations as suggested by Ferrara, this assessment reveals smaller and less distant groups of countries.

Another advantage of this classification is that it looks at all EU25 countries, and thus provides a more comprehensive picture than most of the comparative studies which have been carried out to date. This reflects the availability of EU-SILC data which facilitate cross-country comparisons immeasurably.

By focusing on pension system outcomes, this categorisation provides useful information for those assessing the impacts of reforms. It crystallises the current position of the different countries in a framework which enables an effective monitoring of the impacts of reforms and where further pressures might arise. By contrast, existing categorisations provide little such scope for policy assessments and lack an important forward-looking dimension.

2.4 Conclusion

This chapter sought to understand the interaction between three important dimensions of pension systems: namely state spending, income replacement and the risk-of-poverty among the 65+ population. The choice of these dimensions was based on the observations made in Chapter 1 that spending on pensions is the main item on government budgets across Europe, and that the main goals of pension systems are income replacement and poverty alleviation. Existing categorisations of pension systems tend to focus exclusively on design features, and this makes them susceptible to frequent changes on account of reforms. On the other hand, the proposed multi-dimension categorisation could enable one to understand better the impact of reforms on different countries as it crystallises differences in the current achievement of the twin goals of pension systems and the cost incurred in the process.

The categorisation has resulted in four relatively distinct categories of countries. These groupings differ in some important respects from the usually quoted categorisations, possibly as they are based on actual system results rather than system ideals. This contrast helps to indicate possible sources of system stress. Thus, a priori, one might expect that reforms in countries of Group A would have focused on curbing expenditure; reforms in countries of Group C to have concentrated on improving income replacement; and reforms in countries of Group B to have been focused on two aspects: in countries with high spending – the curbing of spending followed by measures to tackle poverty and income replacement, and in countries with low spending – the expansion of the pension system. The following Chapter will expand further on this, by looking at the reforms undertaken since the 1990s in European pension systems.

3. A review of recent pension reforms in Europe and of studies assessing them

The previous Chapter sought to categorise the different pension systems in the EU25 in view of their current outcomes in terms of spending, poverty alleviation and income smoothing. It indicated that there are at least four clearly defined groups, with different potential sources of pressures to reform. This Chapter will focus on the significant changes in pension systems which were enacted over the 1990s. To a large extent, these reforms have yet to impact on the indicators used in Chapter 2, and thus the categorisation shown there can be seen a starting point for the analysis of the pension reforms of the 1990s. The aim of this Chapter will be to outline the main elements of these reforms, and review a number of studies which have sought to assess their impact. This will enable us to then proceed to make our own evaluation of how reforms might affect pension outcomes, and consequently see how the categorisation set out in Chapter 2 could change in coming years.

3.1 The arguments used to justify pension reforms

While at their inception, pensions were seen as insurance protecting individuals against the risk of living beyond the time when they could work or draw on savings, today they are considered as an annuity enabling withdrawal from the labour market. This change in perception reflects the socio-economic transformations that characterised the twentieth century, changes which enabled many to start enjoying periods of leisure in old age. Consequentially, pensions have started to feature prominently in the lives of individuals, since they provide by far the bulk of income during retirement, as has been shown in Chapter 1.[58]

However, just as pensions became more important for a growing part of society,[59] the capacity of economies of providing them began to be called into question. The main cause for this heightened emphasis on financial sustainability was growing concern of the impact of the ageing process. Over the coming decades, the ratio of the population aged over 65 to that of working age (known as the old age dependency ratio) is projected to rise rapidly. Eurostat forecast in 2008 that while at present this ratio stands at 26%, by 2050 it will have nearly doubled, as shown in Table 3.1.

[58] Forster & Mira D'Ercole (2005) show that in the OECD only in Turkey, Mexico, and Japan, earnings made up more than 50% of the income of the 65+ in 2000. By contrast, "across the OECD countries reviewed, public transfers account for almost all of the disposable income of the bottom quintile of the elderly population and close to 80% of the incomes of the middle 60% of the distribution".

[59] For instance, those who reached State Pension Age in the UK in 1951 constituted less than half of their generation. Current recipients, by contrast, represent more than three quarters of their generation. Of those born in 1985, more than 90% are expected to reach 65 in 2050. See Department of Work and Pensions (2006).

Table 3.1: Old Age dependency ratio (number of people aged 65+/those aged 15-64)

	2009	*2025*	*2050*		*2009*	*2025*	*2050*
EU27	***25.6***	***34.2***	***50.4***	*Hungary*	*23.8*	*33.3*	*50.8*
Cyprus	17.8	24.9	37.7	*Lithuania*	*23.2*	*29.7*	*51.1*
Luxembourg	21.0	27.1	37.8	*Latvia*	*25.1*	*31.1*	*51.2*
UK	24.5	30.4	38.0	*Portugal*	*26.2*	*33.2*	*53.0*
Ireland	16.5	22.3	40.4	*Romania*	*21.3*	*29.1*	*54.0*
Denmark	24.2	34.5	41.3	*Czech Rep.*	*21.2*	*33.8*	*54.8*
Sweden	27.1	35.5	41.9	*Bulgaria*	*25.1*	*33.7*	*55.4*
Belgium	25.9	33.8	43.9	*Slovakia*	*16.7*	*28.5*	*55.5*
France	25.6	35.8	44.7	*Poland*	*18.9*	*32.9*	*55.7*
Netherlands	22.3	34.9	45.6	*Germany*	*30.8*	*39.5*	*56.4*
Finland	25.2	40.6	46.6	*Greece*	*27.8*	*35.4*	*57.0*
Estonia	25.1	31.9	47.2	*Spain*	*24.3*	*30.2*	*58.7*
Austria	25.7	32.7	48.3	*Italy*	*30.8*	*38.0*	*59.2*
Malta	20.1	35.9	49.8	*Slovenia*	*23.5*	*36.2*	*59.4*

Note: Countries arranged in order of the old age dependency in 2050. Countries in italics are projected to have a dependency ratio higher than the EU27 average.
Source: Eurostat (2008) EUROPOP 2008 Convergence scenario.

During the last twenty years, life expectancy at 65 in the EU15 has risen by more than 3 years. Eurostat projections, presented in Table 3.2, show this trend to continue for the next 50 years, with life expectancy forecast to rise by 4 and a half years. In fact, in some of the lower income countries, such as Estonia, Latvia and Bulgaria, the increase will be even more notable, of 6 years or more, or a lengthening of life after the age of 65 by around a half compared to now.

Table 3.2: Life expectancy (period) at 65 (men) - projections

	2008	*2030*	*2050*		*2008*	*2030*	*2050*
EU27	***16.5***	***18.9***	***21.0***	Belgium	16.5	18.8	20.7
Estonia	13.0	16.0	18.6	Netherlands	16.5	18.8	20.8
Latvia	12.7	16.0	18.8	Finland	16.6	18.9	20.9
Bulgaria	13.1	16.1	18.8	*Luxembourg*	*16.8*	*19.1*	*21.0*
Slovakia	13.3	16.3	19.0	*Greece*	*17.2*	*19.3*	*21.1*
Lithuania	13.1	16.3	19.0	*Cyprus*	*17.1*	*19.3*	*21.1*
Romania	13.6	16.6	19.2	*Germany*	*16.8*	*19.1*	*21.1*
Hungary	13.6	16.7	19.4	*Spain*	*17.1*	*19.3*	*21.2*
Czech Rep.	14.7	17.4	19.7	*Austria*	*17.1*	*19.3*	*21.2*
Poland	14.5	17.3	19.8	*UK*	*16.9*	*19.2*	*21.2*
Slovenia	15.7	18.2	20.4	*Sweden*	*17.4*	*19.5*	*21.3*
Malta	15.9	18.3	20.4	*Ireland*	*16.8*	*19.2*	*21.3*
Denmark	16.1	18.4	20.5	*Italy*	*17.5*	*19.7*	*21.5*
Portugal	16.3	18.7	20.7	*France*	*17.7*	*19.9*	*21.7*

Note: Countries arranged in order of the life expectancy projected for 2050. Countries in italics are projected to have higher longevity than the EU27 average.
Source: Eurostat (2008) EUROPOP 2008 Convergence scenario.

The lengthening of life expectancy testifies the success of European economies, but also presents them with tough challenges, as it has been accompanied by a sharp decline in

fertility rates. While in 1960 fertility rates were above replacement in almost all countries, nowadays not a single country in Europe has a fertility rate that is high enough to replace those who will be dying. This decline has been very rapid, particularly in the new Member States. Hence, depending on future trends in net migration, the proportion of the population aged 65+ is set to grow quite rapidly while that of people of working age is expected to start declining in a matter of a few years. While at present there are 4 persons of working age for every person aged 65+, by 2050 the ratio will have fallen to just 2. In some countries like Poland, Ireland, Malta, the Czech Republic and Slovakia, the increase will be even more dramatic with the dependency ratio nearly tripling.

This increase in the dependency ratio will not only, other things being equal, result in a substantial rise in state spending on pensions (and other age-related outlays like health) but is also expected to have significant economic effects. Maddaloni et al (2006) suggest that in the absence of reforms and responses by economic agents, under the assumption of an unchanged rate of labour utilisation and productivity growth, demographic trends imply a decline in average real GDP growth in the Euro-area to around 1% in the period from 2020 to 2050, from the average of 2.1% per year observed between 1980 and 2005. Bosworth & Chodorow-Reich (2007) also show the macroeconomic linkages between national rates of saving and investment and population ageing, using a panel data set of 85 countries covering 1960-2005. The authors find "a significant correlation between the age composition of the population and nations' rates of saving and investment", and suggest a decline in global saving of about 10 percentage points of total income and a drop in global investment of about 5 percentage points by 2050. They conclude that industrial countries will face large current account deficits as they sell off assets to support consumption. Yet, as pointed out in Pension Commission (2004) "the possibility of overseas investment through the global capital market…ameliorates slightly but does not remove the potential return and asset price effects of demographic change" as "demographic trends towards increasing longevity and falling fertility are spreading to all economically successful developing countries far faster than demographers originally assumed".[60]

Yet, it is not just concern about demographic developments that has brought changes in pension arrangements. Increased international competition and changing attitudes towards government intervention appear to have decreased the capacity of policymakers to sustain the rise in taxation needed to finance the growth of state spending in this area. Similarly saving

[60] Appendix B of Pension Commission (2004) reviews the macroeconomics of ageing.

for retirement appears to have regressed in individuals' list of priorities, with participation in occupational plans and saving rates declining among current generations. Furthermore despite increased longevity, working lives have tended to be shorter than those of earlier generations, though recently there has been an increase in the labour market participation of older working-age individuals.[61]

At the same time, in some countries policymakers have been looking again at what their pension systems seek to achieve.[62] Hering (2006) argues that "the causes of reform are often not the central focus of analyses of pension politics, because many scholars assume that these need no further explanation" than restating the demographic argument. However, while all countries face similar demographic trends, governments have responded quite differently. Some have sought to just "reproduce their pension systems, while others seek to transform them". This suggests that reforms have also tended to reflect the preferences and options of governments. Hering (2006) argues that a major cause of reform was the European Monetary Union, in that "the EU's requirement of fiscal sustainability and its deficit and debt rules largely preclude the strategy of refinancing generous public pensions in the face of ageing populations". Accordingly, European governments had to opt for retrenchment and restructuring of state pensions, and instead rely on a mix of public and private pensions.

However structural change may have also been driven by other economic concerns.[63] Thus, reforms carried out in the former communist-bloc countries tended to focus on shifting the responsibility of retirement income provision from the state onto individuals, in an attempt to spur the growth of private enterprise and deepen financial and capital markets. Moves towards notional defined contribution (NDC) schemes (e.g. Sweden) have been justified as resulting in actuarially fair pension systems with correct incentives for individuals to contribute and work.

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[61] Blondell & Scarpetta (1999), for instance, estimated that male retirement ages fell by 4.5 years in the UK and 6.3 years in Italy between 1950 and 1995. During that same time, life expectancy at birth rose by 7.2 years in the UK and 12.8 years in Italy. Eurostat data, however, indicate that since 2000, the average age of withdrawal from the labour force has risen by a year to 63 in the UK and by half a year to 61 in Italy.

[62] For instance, Pension Commission (2005) concluded that "it seems likely that permanently maintaining an earnings-related element within the PAYG system is untenable within acceptable public expenditure limits and will therefore tend (as it did in the 1980s and 1990s) to crowd out adequate flat-rate provision, with means-tested benefits growing to fill the gaps".

[63] Among academics there has been a long debate on the benefits/costs of moving from PAYG to funding. Feldstein (1974), (1996) and (1997) sets out the argument that PAYG has significant deadweight loss as social security tax distorts labour supply and leads to lower saving, while PAYG's implicit rate of return is lower than the return on saving. These arguments have been countered by Orzsag & Stiglitz (1999) and Barr (2000).

De Graaf et al (2007) propose an alternative explanation of reforms. They argue that the reforms reflect a change in the standard life course of European citizens. The previous pension systems were well attuned to the male breadwinner model, in a full-employment economy where acquired skills lasted a lifetime. Recent reforms have sought to adjust this to new realities by individualising pension claims, acknowledging flexibility and giving some attention to care and learning. However the authors find that reforms focus "exclusively on individual biographies and do not systematically take into account the various interdependencies characteristic of the life course, such as the interdependencies between activities within one life course or the interdependencies between different life courses". Thus more reforms can be foreseen in the near future, as policymakers continue to adjust the systems to reflect the new social realities.

Sefton et al (2005) develop a median voter argument to explain future trends in pension reforms. They compare the British, Danish and German retirement systems using a general equilibrium simulation model, and find that the tax/transfer system is cheapest in the UK and most expensive in Germany. They argue that younger workers would prefer the UK system, but the older the population becomes the more preferences shift towards the German system. They conclude that "as the post-war population bulge passes the age of forty-five, the German system is likely to become harder and harder to reform and the UK may experience increased pressure to move towards something similar to the German structure".

Despite the many other causes outlined above, it appears quite evident that financial considerations played the main part in pushing European governments to reform their pension systems. The possible fiscal impact that the ageing of the Baby Boom generation may bring about over the next half century has led many to reconsider seriously the financing of social security. The pay-as-you-go (PAYG) scheme of financing pensions, which had seemed so attractive in the immediate post-war years, in recent years has started to be depicted as an attempt by the post-war generation to play a Ponzi game with the burden of paying for pensions being shifted irresponsibly and unsustainably to future generations.[64] The number of

[64] See for instance, Disney (2000). This depiction has been criticised. For instance, Hills (1995) argues that rather than depicting PAYG as an exploding 'chain letter', one would be more correct in thinking of it as a single line of people passing a box of chocolates to each other. Unless someone panics in the interval between passing on their original box and receiving their neighbour's and stops the game, there would be no losers. Thus "provided the line carries on indefinitely and that no one changes the rules" PAYG need not be unsustainable. This does not necessarily apply when one has a shrinking population, as in this case the line is becoming less populated.

studies looking at the increase in spending on pensions mushroomed, soon to be followed by wide-ranging reforms meant to achieve 'sustainability'.[65]

The EU's Economic Policy Committee (2009) indicates that spending on public pensions in the EU15 is projected to rise from 10.2% in 2007 to 12.5% of GDP in 2050. However an earlier study (Economic Policy Committee (2006)) noted that in 2001 the EU15 countries had projected an increase in spending on pensions of 2.9% of GDP by 2050. Thus reforms carried out in 8 years managed to wipe away more than one-fifth of the projected budgetary impact of ageing. This decline in projected spending occurred despite that during these years, forecasts of life expectancy were revised upwards considerably and the study states that "public spending on pensions appears to be most sensitive to changes in life expectancy".[66]

Table 3.3: Public pension expenditure, before taxes (as a % of GDP) – projections

	2007	*2030*	*2050*		*2007*	*2030*	*2050*
EU27	***10.1***	***11.6***	***12.3***	*Germany*	*10.4*	*11.5*	*12.2*
Estonia	5.6	5.6	5.3	*Finland*	*10.0*	*13.9*	*13.2*
Latvia	5.4	5.8	5.8	*Hungary*	*10.9*	*11.1*	*13.3*
Ireland	4.0	5.4	8.0	*Portugal*	*11.4*	*12.6*	*13.4*
UK	6.6	7.6	8.1	*Austria*	*12.8*	*13.9*	*14.1*
Poland	11.6	9.5	9.1	*France*	*13.0*	*14.2*	*14.2*
Sweden	9.5	9.5	9.1	*Romania*	*6.6*	*10.2*	*14.6*
Slovakia	6.8	7.3	9.4	*Italy*	*14.0*	*14.8*	*14.8*
Denmark	9.1	10.6	9.6	*Belgium*	*10.0*	*13.8*	*14.8*
Czech Rep.	7.8	7.2	10.2	*Spain*	*8.4*	*10.8*	*14.8*
Netherlands	6.6	9.3	10.3	*Cyprus*	*6.3*	*10.8*	*15.5*
Lithuania	6.8	8.2	10.4	*Slovenia*	*9.9*	*13.3*	*18.3*
Bulgaria	8.3	8.6	10.8	*Luxembourg*	*8.7*	*14.2*	*22.1*
Malta	*7.2*	*9.5*	*12.0*	*Greece*	*11.7*	*17.1*	*24.0*

Note: Countries arranged in order of their spending projections for 2050. Countries in italics are projected to have higher spending than the EU27 average.
Source: Economic Policy Committee (2009).

However, it is increasingly being pointed out that policymakers have not given enough consideration to the impact that pension reforms will have on the elderly.[67] A clear example of this shift in thinking is the World Bank's stance on pension reform over the last decade. Whereas back in 1994, the Bank had been an all-out proponent of privatisation as exemplified

[65] See Blanchet (2005) for a description of the process in France, which started with a report published in 1986 on the economic consequences of ageing and culminated with the 1993 and 2003 pension reforms.
[66] The upward revision in life expectancy added up to 2 years to the projected increase in longevity in most countries.
[67] For instance, Forster and Mira D'Ercole (2005) concluded that "changes in the generosity of public transfers and taxes have played the largest role in shaping changes in poverty risks among the elderly within individual countries" of the OECD during the second half of the 1990s.

in its 'Averting the Old Age crisis', by 2006 its Independent Evaluation Group (IEG)[68] found that "Bank involvement in pension reform was often prompted by concerns about fiscal sustainability. Yet, in doing so, there often was a neglect of the primary goal of a pension system: to reduce poverty and provide retirement income *within* a fiscal constraint".[69]

In response to these concerns, international institutions, such as the EU Commission and the OECD, have started to look more closely at how pension reforms are affecting pension entitlements and to what extent achieving the goal of fiscal sustainability has led to a marginalisation of the objective of having adequate pensions.

3.2 An outline of pension reforms in Europe since the 1990s

Though the popular press tends to characterise Europe as being an opinionated laggard in terms of structural reform, attached to its 'outdated' social model, any objective reviewer of the recent history of European social policy would be struck with the extent of the reforms which have taken place since the 1990s. This section will give an outline of these reforms, showing how the pensions landscape in Europe, particularly for younger generations, has changed dramatically.

At the start of the 1990s one pension model dominated Western Europe. This model was run by the state, based on the PAYG funding principle and with an earnings-related DB benefit determination structure. There tended to be some variants – for instance Germany had a points system,[70] Ireland had a flat rate system,[71] while the Dutch state system was supported by quasi-mandatory occupational provision. However these tended to be minor exceptions in a broadly similar landscape. Throughout most of the second half of the twentieth century, reforms in Europe had tended to move countries closer to this single pension model, with even Beveridgean countries, like the UK, introducing earnings-related features, and countries in Southern Europe moving away from traditional methods of family support during old-age and instead trying to adopt the state provision levels of their Northern neighbours.

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[68] The IEG is an independent unit within the World Bank that reports directly to the Bank's Board of Executive Directors, and acts as an auditor of the impact of policies advocated by the Bank.

[69] The World Bank Independent Evaluation Group (2006). The World Bank's approach and its insistence on having a mandatory fully funded second pillar has been criticised by a number of economists, such as Kotlikoff (1999), Orszag & Stiglitz (1999) and Modigliani & Muralidhar (2005).

[70] Under a points system, entitlement is based on pension points accumulated. A year's contribution at the average earnings earns one point. Points are multiplied by a pension value to determine the monthly benefit.

[71] Under a flat-rate system, all those who meet the set conditions get paid the same benefits. In an earnings-related DB system, benefits are determined as a ratio of a set salary – the final salary, the average lifetime salary or an intermediate figure - on which contributions were paid.

The 1990s, however, saw a departure from this trend in Western Europe and also the accession into the EU of Eastern European states who nearly all had transformed their systems away from PAYG DB. Hering (2006) notes that "two-thirds of the 15 old EU countries reproduced their pension systems by enacting numerous marginal adjustment measures, focusing either on the refinancing or retrenchment of public pensions…but four countries—Sweden, Italy, Germany and Austria—restructured their pension systems by cutting public pensions and replacing these increasingly with private ones, and thus began a gradual shift from the dominant pillar model to the multi-pillar one". This trend occurred without the concerted action of the EU Commission, as despite some moves towards information exchange and peer-review in the area of pensions there was no effort from the Commission to propose an institutional model for Member States' pension systems – in contrast with developments in monetary policy, environmental policy and other regulatory policies. In its first report on pensions, the Social Protection Committee – the EU institution charged with monitoring pension policy[72] - had stated "… no type of pension scheme (pay-as-you-go vs. funded, private vs. public, defined benefit vs. defined contribution) can be regarded as superior to another".[73] By contrast the change in Eastern Europe can be said to have been mostly driven by the World Bank which actively promoted its multi-pillar approach.[74]

Table 3.4: Structural pension reform in Western Europe, 1995-2004

Institutional development	*Dominant pillar systems*	*Multi-pillar systems*
Reproduction by Adaptation	Luxembourg Belgium Finland Spain Portugal France Greece	Denmark UK Ireland Netherlands
Gradual Transformation	Sweden Germany Italy Austria	

Source: Hering (2006).

[72] Detailed information on the role, composition and work of the SPC can be found at: http://ec.europa.eu/employment_social/social_protection_commitee/index_en.htm

[73] SPC (2000).

[74] The only concession the Commission allowed in favour of multi-pillar reforms is that their costs is taken into consideration when applying the excessive deficit procedure of the Stability and Growth Pact. This move was questioned by the European Central Bank (see Gonzalez-Paramo (2005)), which deemed it as potentially delaying fiscal consolidation. Similarly, the International Monetary Fund (IMF) had never been strongly in favour of the multi-pillar reforms championed by the World Bank.

Bonoli & Palier (2007) in their review of the political processes that led to reforms in France, Germany and Italy argue that "comparing the politics of these reforms shows some similar trends". They visualise four stages of reform. Until the late 1980s, there was no retrenchment and the main action was to increase payroll taxes to finance shortfalls. Concern over the level of contributions then led to some moderate retrenchment; usually changes in indexation. While resulting in only minor effects, the first reforms tended to be important as they brought pension reform, population ageing and the future of social security into the public debate. More radical reforms were pushed for in the early 1990s, though reforms were usually still negotiated on the basis of a quid pro quo: benefits were intended progressively to decrease in exchange for some concession, e.g. non-contributory pensions being financed from general tax revenues instead of through the insurance schemes. The first moves towards funded private provision were also made at this stage. Finally, the second wave of reforms (during the late 1990s) brought more innovation, such as the development of voluntary private pension funds and moves to increase employment rates among the elderly and to stop early retirement.

Table 3.5: Year of reform, full implementation and time lag for major pension reforms in France, Germany and Italy

	Year of reform	*Full implementation*	*Time lag in years*
France	1993	2004	11
	2003	2020	17
Germany	1989	2012	23
	1999	2025	26
	2006	2029	24
Italy	1992	2032	40
	1995	2035	40

Source: Bonoli & Palier (2007).

The authors also point out that the more substantial reforms tended to have long phasing-in periods (see Table 3.5). This ensures that "the large and politically influential cohorts of baby boomers, due to enter into retirement between 2010 and 2030, will be affected only marginally by the reform". For instance, only about one in seven of the current Italian electorate will be affected fully. While one might concede that reforms have been gradual and heavily negotiated, this should not be misconstrued as a claim that there has been reform inertia. Reviewing the last decade (see Table 3.6), OECD (2007) finds that "the period since the early 1990s has been one of intense reform in OECD pension systems" and that "much more action has been taken on both reforming benefits but also contributions to make systems both financially and socially sustainable than countries are often given credit for".

Table 3.6: Reforms to national retirement income systems put in place between 1990 and 2005, selected OECD countries

Country	Pension eligibility age	Adjusted retirement incentives	Change of years in benefit formula or qualifying conditions	Link to life expectancy and/or financial sustainability	Defined contribution scheme	Other
Austria	Early retirement age increased by 1.5 years. Pension ages for women aligned with those of men.	Benefit reduction for early retirement introduced and set to increase. Tighter access to early retirement.	Best 15 years to 40 years.	Introduction of sustainability factor under discussion.		Reduction in accrual rate. Less generous indexation for higher pensions.
Belgium	Pension age for women aligned with that for men.		Contribution condition for early retirement at 60 tightened.			
Czech Rep	Phased increase in normal pension age to 63.					
Denmark	Phased increase in normal pension age from 65 to 67.			Normal pension age linked to life expectancy.		
Finland		Increased accrual rate for people working age 63-67.	10 last years to lifetime average.	Life expectancy multiplier (from 2010).		Basic part of national pension income-tested. Less generous valorisation of past earnings and indexation of pensions.
France		Changes in adjustment to benefits for early/late retirement in public and occupational pensions.	Minimum contribution period increased. Earnings measure in public scheme from best 10 to best 25 years.	Minimum contribution period to increase further with changes in life expectancy.		Targeted minimum income of 85% of minimum wage. Valorisation now effectively to prices in both plans.
Germany		Reduction in benefits for retirement before 65.		Valorisation and indexation cut back as system dependency ratio worsens.	Voluntary DC pensions with tax privileges.	Phased abolition of favourable tax treatment of pension income.
Greece	Pension age rising from 58 to 65.					
Hungary	Increase in pension age 55 for women and 60 for men to 62 for both.	Accrual rates linear rather than higher for earlier years.		Through annuity calculation in DC scheme.	DC scheme: mandatory for new entrants, voluntary for existing workers.	Minimum pension to be abolished. Less generous indexation of pensions.
Ireland					Incentives for voluntary retirement savings.	Pre-funding of public pensions. Increase in basic pension.

Table 3.6: Reforms to national retirement income systems put in place between 1990 and 2005, selected OECD countries….cont..

Country	Pension eligibility age	Adjusted retirement incentives	Change of years in benefit formula or qualifying conditions	Link to life expectancy and/or financial sustainability	Defined contribution scheme	Other
Italy	Pension age for men from 60 to 65 & women from 55 to 60. Early pension age for men with 35 years' coverage increases to 62.	Adjustment to early-retirement benefits through notional annuity calculation.	Qualification years for long-service pension increased from 37 to 40 years.	Through notional annuity calculation		From DB to notional accounts. Less generous indexation of higher pensions.
Netherlands		Planned abolition of early retirement programme.	Shift from final to average salary in many occupational plans.			
Poland	Withdrawal of early retirement for certain groups of workers.		From best consecutive 10 in final 20 to lifetime average.	Through notional annuity calculation in public scheme and annuity calculation in DC.	DC scheme mandatory for new entrants and workers under 30.	Abolition of basic pension. From DB to notional accounts.
Portugal	Pensionable age for women aligned with that for men at 65.	Introduction of increments for late retirement and reductions for early retirement.	From best 10 out of last 15 years to lifetime average earnings			
Slovakia	Increase in pension ages to 62 for men and women.		From best 5 in final 10 to lifetime average earnings.		DC scheme mandatory for new entrants and voluntary for existing workers.	From DB to points system.
Sweden			Best 15 years to lifetime average (public, earnings-related scheme).	Through calculation of notional annuity and annuity in DC schemes. Additional sustainability adjustment in notional accounts.	DC scheme mandatory for nearly all workers. Occupational plans switch from DB to DC.	From DB to notional accounts.
UK	Women's pension age and eligibility for guarantee credit rising from 60 to 65	Increment for deferring pension claim increased. Lump sum option added.			Employers required to provide access to DC ('stakeholder') pension.	Increase in basic pension. Extension of means-tested supplements. Increased progressivity of earnings-related pension.

Source: OECD (2007).

Table 3.6 presents a review of these changes, focusing on changes in the eligibility age, adjustments in retirement incentives, changes in qualifying conditions or benefit determination, the introduction of links to life expectancy or financial sustainability and moves toward DC. However rather than focusing on detailed information on the reforms, it is more convenient to categorise reforms into two broad sets: parametric and systemic. The *parametric reforms* maintained unchanged the PAYG nature of pension systems but made substantial changes to their underlying rules – such as those on the accrual of pension entitlements, the age at which benefits are received, and required contribution periods.[75] Other countries have opted instead for *systemic reforms* i.e. moving away from the PAYG DB structure and adopting DC type schemes. Here one can discern two main types of reforms: World-Bank inspired multi-pillar reforms based on personal accounts (e.g. Slovakia, Estonia and Hungary) and the adoption of NDC systems (e.g. Sweden, Italy, Poland and Latvia). The OECD's review notes that "around half of the major pension reforms in OECD countries in the last decade have involved fundamental systemic changes".

The distinction between parametric and systemic reforms has its shortcomings. For instance, while Germany and France, have not shifted totally to NDC (and thus they are categorised as countries with parametric reforms), but they have introduced features that mimic the rules of an NDC model. France has introduced a link between the number of contribution years and life expectancy while Germany has adopted a sustainability factor that links the level of pension benefits to the dependency ratio. In the same vein, Austria has also significantly modified its public pension plans and could be said to now have a personal notional defined benefit account system.[76] Besides these categorisation issues, one also needs to keep in mind the caution made in OECD (2007) that "systemic pension reform is not an indispensable condition for change" as "several countries have cut benefit entitlements substantially without changing the fundamental structure of their pension systems".

3.21 Parametric reforms

The main difference between parametric and systemic reform lies not in the financial impact on pensioners (or contributors) but in the sharing of risk between the current generation and future ones or the state (the custodian of future generations in this respect). Parametric reforms maintain the existing set-up of pension systems. This has several important implications, such

[75] The impact of parametric reforms can be quite considerable. For instance, whereas in 2001, Germany was forecasting an increase of 5.5 percentage points in spending over the next half century, now it expects an increase of just 1.8 percentage points.
[76] For more details, see Knell (2005).

as the fact that longevity risk is still borne by the pension provider rather than the pensioner. Moreover redistribution is still possible under a DB system, something that is not achievable under DC, unless one puts in place subsidies for non-contributory periods (such as care and unemployment) and/or minimum income guarantees.

Table 3.7 summarises the main parametric reforms that have taken place, or are gradually being introduced, in the PAYG DB public pension schemes of the EU25. In some cases, some countries that have made systemic reforms are also listed in the Table, e.g. Italy. This is because in these countries the old schemes still apply to older cohorts of workers, and governments have sought to reform these also.

Table 3.7: Countries that had in place parametric reforms between 1995/96 and 2005

Eligibility Age	**Contribution Rate**	**Contribution Requirement**	**Benefit Indexation**	**Pension Formula**
Austria	Czech Rep.	Austria	Austria	Austria
Belgium	Denmark	Belgium	Germany	Belgium
Cyprus	Finland	Czech Rep.	Greece	Czech Rep.
Czech Rep.	Germany	Denmark	Hungary	Finland
Denmark	Hungary	Finland	Spain	France
Estonia	Ireland	France	Slovakia	Greece
Finland	Italy	Germany		Hungary
Germany	Latvia	Ireland		Italy
Greece	Lithuania	Italy		France
Hungary	Malta	Slovakia		Luxembourg
Italy	Netherlands	Slovenia		Portugal
Latvia	Portugal	Spain		Slovakia
Lithuania	Slovakia			Slovenia
Portugal	U.K.			Spain
Slovakia				U.K.
U.K.				

Source: Zaidi et al (2006).

The most frequent reform has involved increasing the eligibility age. This reform, though politically difficult, tends to be more easily justifiable than reductions in generosity, as it can be linked directly to the increase in longevity. Moreover in many cases, the reform has just involved the equalisation of the statutory retirement age between genders. Only Eastern European countries and Italy have effectively increased the eligibility age for both genders. However, the approaching retirement of the Baby Boom generation is increasing the attractiveness of this policy. Since the reforms summarised in Table 3.6, Denmark, Germany and the UK have legislated further increases in the pension age. This reform is meant to

increase revenues, by adding more years of contributions, while decreasing the longevity risk borne by the state.

The second most common reform has been modifying the contribution rate. Again while politically difficult, this reform can be justified as a means to bolster finances ahead of the demographic transition. Given the PAYG-nature of public schemes, this reform, on its own, does not necessarily reduce future commitments. Thus, in some cases, such as Ireland, this reform has been accompanied by the establishment of reserve funds that will be used to finance the projected increase in spending. In this way, countries are able to conduct tax smoothing; increasing contribution rates only gradually over time and by a smaller amount as extra funds collected before the system goes in deficit would have earned interest.

Another measure that impacts on both revenues and expenditures is changing contribution requirements. Many European countries have scaled back the early retirement schemes they put in place in the 1970s and 1980s. Contribution requirements for early retirement, or deductions for taking up pensions before the statutory pension age, have risen in many countries. More crucially, the period of minimum contributions needed to qualify for the maximum pension has been increased. For example, in France after 2009, "the number of contribution years will increase following the increase in life expectancy through a rule keeping constant the ratio of the number of contribution years and the number of years in pension to the level of 1.79 as in 2003".[77]

Turning to benefit determination, during the last decade more countries moved away from uprating pensions with earnings. Austria and Germany at first moved towards linking pensions to net earnings, so that the burden of any increases in social security contributions would be more fairly shared between workers and pensioners. More recently they have both moved to even less generous indexation: Austria adopted price uprating and Germany introduced the 'sustainability factor' to adjust pension benefit indexation. Other countries, like Hungary and Slovakia, went for the so-called Swiss formula (50% price uprating and 50% earnings uprating). The UK, conversely, moved in the opposite direction, returning to earnings indexation after having adopted price linking in the early 1980s. This reform reflects the fact that by 2050 the basic pension would have fallen so much that most pensioners would become dependent on means tested pensions, reducing incentives to save.

In view of the variety of pension benefit formulae, it is hard to synthesise the main changes. In general, governments have either reduced accrual rates or else moved from linear

[77] See Carone (2005).

schedules to ones which provide a better return for those who remain in work after a certain age. As for the pensionable salary, most countries used to have schemes that limited the determination of this salary to final career years. In recent years, there has been a considerable lengthening of this period. Portugal and Hungary, for example, have moved towards calculating the pensionable income as the average lifetime salary.

3.22 Systemic reforms

In essence there have been two broad types of systemic reforms – those inspired by the World Bank multi-pillar model (described in Chapter 2) and those setting up NDC schemes (see Table 3.8). Though in both cases, the main difference with DB schemes is the structure of determination of pension benefits, there are some major differences between the two strands of reforms and their impact on pensioners' incomes is also likely to be quite distinct.

Table 3.8: Countries that have made systemic reforms

NDC (First or Second Tier)	**Funded Second tier of mandatory scheme**
Italy	Estonia
Latvia	Hungary
Poland	Latvia
Sweden	Lithuania
	Poland
	Slovakia
	Slovenia
	Sweden

Source: Zaidi et al (2006).

a) World Bank Multi-pillar reforms

Prior to EU accession, many Eastern European countries enacted multi-pillar pension systems, often after assistance from the World Bank.[78] IEG (2006) reports that eleven of 24 Bank-supported European and Central Asian countries implemented multi-pillar reforms. However reforms in this region differ from those in Latin America, as multi-pillar systems in Europe tend to include a fairly substantial contribution-based PAYG pillar, for instance Hungary and Latvia. Moreover reforms tended to be influenced by the NDC reforms of Sweden and Italy (particularly in cases when Sweden was also a donor country) and in Poland and Latvia, the first pillar was converted from PAYG to NDC.

Reform in Eastern Europe took place in a context of transition to a market economy system. The financial and social crisis faced by these countries resulted in large informal

[78] These are Poland, Estonia, Latvia, Slovakia, Lithuania, Hungary, Romania and Bulgaria. Sweden, an existing Member State, also introduced a mandatory DC funded pillar, but this is minor contrasted to its main pillar.

sectors and increased tax evasion, while large unemployment and redundancies from privatised firms worsened the ratio of contributors to beneficiaries. In Poland and Hungary the number of contributors declined by 15% and 25%. Early retirement, in part, led to an increase in the number of pensioners by 10% in the Czech Republic, 20% in Hungary and a massive 50% in Poland.[79] This put the PAYG system of financing pensions seriously under question.

Setting up systems of individual accounts was seen as an effective means to boost financial sector development, help privatisation and spread the values of the market economy among the population.[80] However several studies have noted that in many countries the preconditions for administering private systems were not in place and thus there were serious implementation problems.[81] In Hungary and Poland, the number of workers shifting to private accounts exceeded expectations and reduced the contributions to the PAYG pillar, reducing its sustainability. Recently, in the wake of the financial crisis, some governments have been redirecting some of these contributions back. As in Latin America, administrative expenses are high[82] and the industry consolidated in a way that a few companies started to dominate it. Markets for annuities proved to be difficult to set up; while pension funds ended up investing mainly in government paper (which coupled with the high administrative costs implied by their decentralised set-up reduced the potential benefits for contributors). Moreover in some countries, the collection and the management of contribution records was affected by administrative and technical hitches.[83]

The move to DC implied that contributions and benefits of an individual became directly linked and this reduced redistribution possibilities. Progressive elements in pension formulae were removed or decreased, cases in point being Hungary and Poland. This move also makes it crucial to have adequate crediting systems for periods during which an individual is prevented by circumstances, such as sickness, unemployment, training or child and adult caring, from contributing. However, there is evidence that in many cases this was not prioritised. Fultz and Steinhilber (2003) report that in Hungary contributors to personal accounts contribute 6% of their child care benefit to the pension system and their future pension benefits will be calculated as a simple return on this contribution. Since this is much less than the previous credits, carers will be worse off.

[79] See Fultz & Steinhilber (2003).
[80] See Wehlau & Sommer (2004).
[81] See Kritzer (2002).
[82] Whitehouse (2000) reports that countries with similar systems based on individual accounts with individual choice of provider have average charges that vary from less than 15% to more than 30%.
[83] For a full assessment of these problems, see Fultz & Stanovnik (2004).

In many cases, people had the option of staying within the old public DB-type PAYG system or move to the personal accounts pillar. Similar to what happened in the UK with the introduction of personal pensions in 1988, in many cases people who switched may have become less well off as a result. Chlon-Dominczak (2000) shows that surveys in Poland showed that "most people felt they were well informed and that information on the pension reform was readily available", but then surveys often showed "that the knowledge of the pension system was limited to slogans rather than a deep understanding". Moreover while there are indications of rational switching, there is "some evidence that choices made were not based on a detailed understanding of the new system". The study also notes that "a significant proportion of people simply joined the pension fund of the first agent they came across". In recent years, there have been calls for individuals to be given the option to return to their previous pension arrangement, and in Slovakia government has allowed this possibility.

b) NDC schemes

Whereas the multi-pillar personal account systems are based on individual contributions being invested in financial markets, in an NDC system contributions are retained by the state and the financing structure remains essentially PAYG. However pension benefits are determined according to the DC formula, i.e. by the accumulated contributions at retirement.[84] The rate of return faced under an NDC is centrally determined and reflects the formula chosen (normally growth in the wage bill), whereas under personal accounts returns depend on the investment choices made by individuals and the performance of financial markets. This has significant implications in that all face the same risks on return under NDC, and thus there is no income inequality resulting from individual choices.

The notional return in NDC can, however, differ from the return under PAYG, as NDC schemes attempt to ensure that the 'assets' and 'liabilities' of the system balance out. For instance, in Sweden through the operation of the automatic balance mechanism, government reviews annually the system and if the calculation reveals an unfunded liability, the notional account interest (set at the growth of average wages) and the indexing of annuities is reduced.[85] With the NDC system, the financial risk of changing economic and demographic factors is shifted from the state to current and future pensioners. Besides this, the system also adjusts for longevity through changes in the annuity divisor, which converts the notional account upon retirement into pension benefits. As retirees' life span increases, the monthly

[84] For an extensive explanation of how an NDC system operates, see Palmer (2006).
[85] Note that in the wake of the recent economic crisis, most governments, though not the Swedish one, opted to ignore these mechanisms.

benefit declines unless individuals delay retirement. Capretta (2006) reports for the Swedish system that "based on mid-range demographic and economic assumptions, the Government projects that the life span adjustment will cut average monthly benefits for those continuing to retire at age 65 by 14% by 2055". Franco & Sartor (2006) report that "the Government expects the automatic balance mechanism to be triggered only 'a few times' over the next 15 years, thus only modestly cutting the rate of return applied to the notional accounts".

Countries that opted to adopt an NDC system seek to achieve financial sustainability without having to go through the costly process of fully funding pension promises. NDCs, in fact, operate on the same DC basis as personal account systems, with automatic stabilisers intended to keep expenditure consistent with the contributions received, but without the requirement of having to pay for implicit pension liabilities. Moreover NDC schemes are less expensive to administer than multi-pillar pension systems, in that they do not involve actual investment of funds. This is not to say that multi-pillar systems cannot be organised in a way that reduces the administrative charges faced by contributors. The Swedish pension system also includes a relatively small personal account component which due to its centralised organisation faces significantly lower costs than those in Eastern Europe.

3.3 Studies which assessed the impact of reforms on pension system outcomes

A substantial part of the literature which assesses pension reform focuses exclusively on its effects on government finances, or rather on spending on pensions. The problems with this approach will be dealt with in Chapter 4, but suffice it to say at this stage that it seems strange to be assessing changes to a system without evaluating what impact these will have on its capability to achieve its set goals. However, despite the preponderance of studies on the fiscal effects of pension reform, there have been studies which have looked beyond this aspect and tried to look at how pension reform affects outcomes. This section will try to summarise the main types of study, through the use of a simple taxonomy.

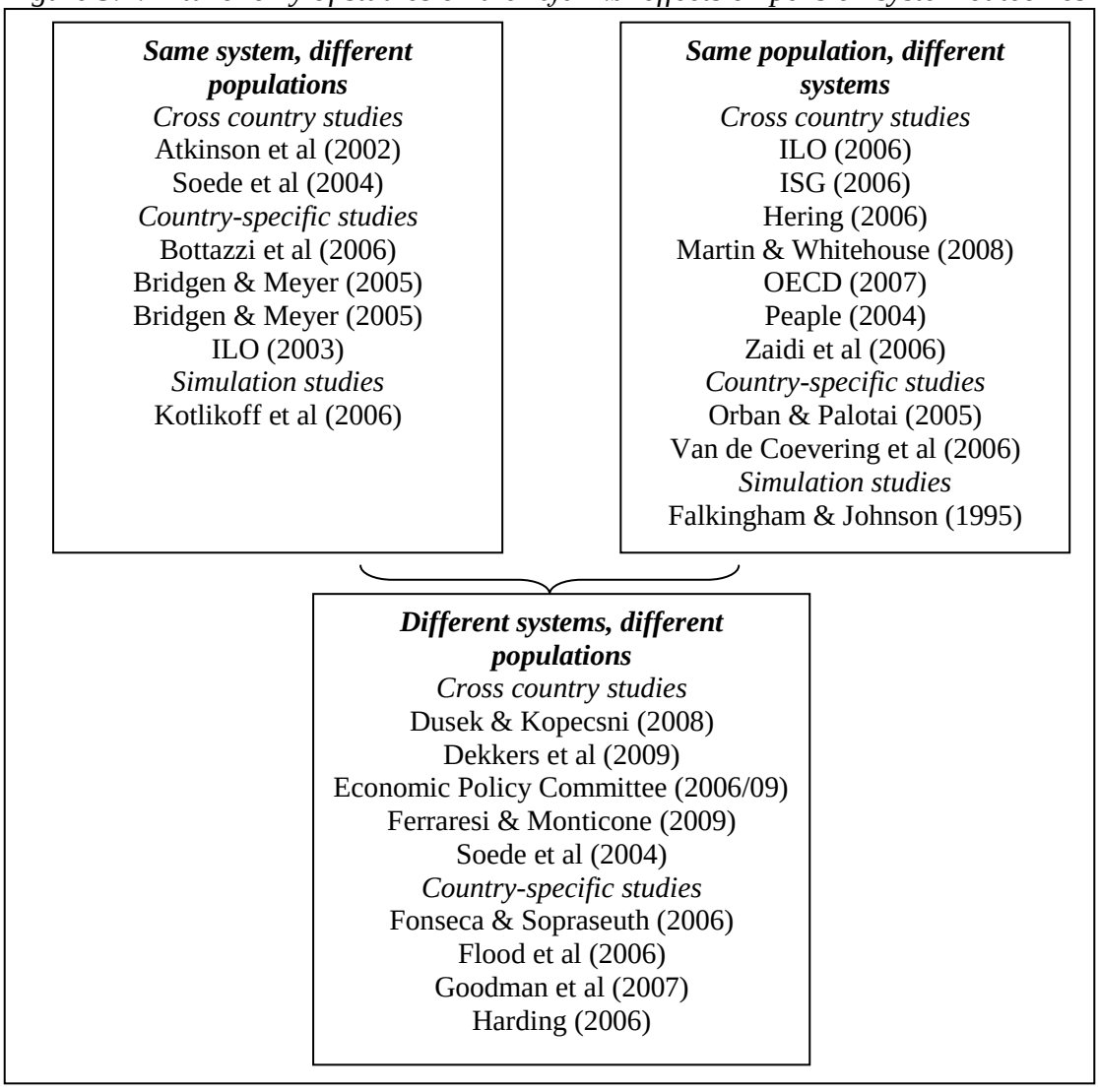
3.31 A taxonomy of studies of the impact of pension reform

When attempting to assess the impacts of a pension system, there are two main considerations. Firstly the outcomes of a given set of pension rules will depend on the characteristics of the population which the system serves. Thus, for instance, a highly earnings-related pension system will have different effects on poverty alleviation when there is high income inequality, than it would if it applied to a population with low income inequality. Secondly, if one, on the other hand, holds constant the characteristics of the population served by a system, different

pension rules would have different outcomes. Stating the above considerations, slightly differently, changes in the achievement of the goals of a pension system may be brought about by either a change in pension system rules or by a change in the population served by it.

This suggests that there are two ways in which one might want to isolate the effects of pension systems. One could apply the same set of pension rules to populations with different characteristics or one could apply different set of rules on the same population. If one is not concerned in isolating these two effects, another approach would be to assess changes in outcomes when both system rules and population characteristics change. This suggests that studies can be broadly divided into three types, as can be seen in Figure 3.1. Within these categories, one can adopt three different approaches, namely studying reforms in just one country, carrying out cross-country analysis of reforms and hypothetical reform simulations.

Figure 3.1: A taxonomy of studies on the reforms' effects on pension system outcomes



3.32 Studies assessing the influence of reforms in the pension system's structure

The most frequently taken approach involves maintaining the population constant and modifying the pension system and ascertaining the implications of reforms. This is the approach taken in ISG (2006) and OECD (2007) which estimate changes in replacement ratios[86] (see Table 3.9). Martin & Whitehouse (2008), on the basis of the OECD calculations, argue that the size of the pension promise has declined in many countries, and point out that in some countries which introduced a closer link between pensions and earnings – such as Italy, Poland and Slovakia – the drop has been mostly felt by those on low incomes. The authors argue that the reforms may lead to higher old-age poverty unless stronger safety nets are put in place.

*Table 3.9: Pension levels pre- and post-reform for low-income workers in 2046**

	Pre-reform	*Post-reform*
Austria	57.8	53.2
Finland	45.9	45.1
France	42.8	42.1
Germany	39.7	32.0
Hungary	55.7	55.6
Italy	55.9	46.7
Poland	54.0	41.2
Slovakia	41.8	36.5
Sweden	53.6	43.7
UK	29.4	36.0

** A comparison of the average (post-tax) pension benefit earned by individuals retiring at 65 on half median earnings with the post-tax labour income of workers on median earnings.*
Source: OECD (2007).

Hering (2006) also reports significant declines in replacement rates after the different kinds of reform put in place in Western Europe by 2004 (see Table 3.10). Similarly Peaple (2004), in his study of pensions in the EU's six largest countries, finds large falls in replacement rates for France, Germany, Italy and the UK over the next 25 to 50 years.[87]

[86] A replacement ratio is the measure comparing pension entitlements to previous earning.
[87] These studies of replacement rates look at a number of countries. There are several studies which focus on one country. For instance, Borsch-Supan & Wilke (2006) looks at the reform in Germany.

*Table 3.10: Projected pension reform outcomes in Western Europe, 2004**

	State replacement rate		*State plus private replacement*	
	2002	*2050*	*2020*	*2050*
Refinancing				
Belgium	36.5	36.6	40.0	48.8
Ireland	31.4	34.0	66.7	66.7
Luxembourg	89.5	89.5	89.5	89.5
Netherlands	32.6	32.6	70.0	70.0
Retrenchment				
Denmark	41.7	33.6	45.1	68.9
Finland	57.6	53.8	57.6	53.8
France	65.0	56.8	65.0	56.8
Greece	108.0	94.7	108.0	94.7
Portugal	72.3	64.9	72.3	64.9
Spain	88.6	83.0	88.6	83.0
UK	16.6	11.4	66.6	61.4
Restructuring				
Austria	74.3	66.9	74.3	66.9
Germany	44.6	37.8	50.1	50.5
Italy	79.6	64.6	79.6	84.1
Sweden	57.0	40.1	70.9	54.4

** The ratio of gross pension benefits for people retiring at 65 on median earnings to their previous level of labour income.*
Source: Hering (2006).

These studies, however, shy away from trying to assess quantitatively the effects of the estimated declines in replacement ratios, limiting themselves to qualitative statements on the possible implications or not delving into the issue at any great length.[88] By contrast, Zaidi et al (2006) makes a first attempt at using the indicators developed as a result of the EU's open method of coordination (OMC) in order to assess future risks of poverty. They, first, estimate a relationship between aggregate replacement rates and the at-risk-of-poverty rates among EU Member States. They then extend the aggregate replacement ratios forwards on the basis of the trend in the average benefit ratios derived from Economic Policy Committee (2006), and using their estimated relationship between aggregate replacement ratios and the at-risk-of-poverty rates project the latter in the future (see Table 3.11).

[88] ILO (2006) also assesses the impact of pension reforms in Baltic States by using comparisons of pre- and post-reform replacement rates, but includes a fuller treatment of the possible effects of this decline in generosity on poverty rates.

Table 3.11: Projections of at-risk-of-poverty rates (%) for 65+, 2025 and 2050

	Total			*Men*			*Women*		
	Now	*2025*	*2050*	*Now*	*2025*	*2050*	*Now*	*2025*	*2050*
Belgium	21.0	21.3	24.6	20.0	20.3	23.4	21.0	21.3	24.7
Denmark	17.0	19.5	19.8	16.0	18.5	18.7	18.0	20.6	20.9
Estonia	17.0	30.0	44.0	7.0	19.4	32.8	22.0	35.4	49.9
Spain	30.0	25.9	30.2	27.0	23.2	27.2	32.0	26.7	32.3
France	16.0	24.1	29.5	14.0	21.7	26.8	17.0	25.2	30.6
Ireland	40.0	33.3	35.9	34.0	27.8	30.2	45.0	37.4	40.4
Italy	16.0	19.7	34.7	13.0	16.7	31.3	18.0	21.5	35.6
Cyprus	52.0	52.1	45.3	48.0	48.1	41.8	55.0	55.1	48.1
Latvia	14.0	22.7	29.9	7.0	16.3	24.0	17.0	26.0	33.5
Lithuania	12.0	6.1	13.3	5.0	0.0	6.3	15.0	9.1	16.3
Malta	20.0	23.5	43.6	19.0	22.6	43.6	20.0	22.9	39.3
Austria	17.0	22.5	36.1	13.0	18.3	31.3	20.0	25.6	39.3
Portugal	29.0	33.1	32.8	29.0	32.9	32.6	30.0	34.2	33.9
Slovenia	19.0	23.3	23.6	11.0	15.4	15.7	23.0	27.0	27.3
Finland	17.0	19.6	21.7	11.0	13.5	15.5	20.0	22.6	24.7
Sweden	14.0	25.2	27.8	9.0	20.1	22.6	18.0	29.1	31.6

Source: Zaidi et al (2006).

The authors conclude that "the anticipated decline in generosity is expected to result in an increase in at-risk-of-poverty rates among the 65+". However they also caution that "this analysis should, however, be treated with caution as it is based on the current relationship (between aggregate replacement ratios and at-risk-of-poverty rates) holding over time" and also because "it is based on a limited number of countries and so results may not be statistically very robust". Another underlying assumption of the study, which the authors do not point out, is that it implicitly assumes that the population structure faced by pension systems in the future remains unchanged, and that the distribution of income stays constant. This may lead to incorrect predictions if systems are biased against particular groups, e.g. people with career breaks, and over time the importance of this group increases.

Most cross-country studies of pension reform have focused on looking at replacement rates before and after reform. However country-specific research has looked beyond simple replacement rates, particularly in the case of systemic reforms. While difficult to reproduce on a cross-country basis, such studies present interesting methodologies. Orban & Palotai (2005), for instance, compare "pension benefits that a typical old-age pensioner in a pure PAYG system would receive…with that received by the same individual in the multi-pillar system from the government (a reduced PAYG-benefit) and the private pension fund together" for Hungary. Their objective is to understand what rate of return on private pension contributions

is needed for individuals to remain as well off as if they had remained under the public scheme, and compare it with actual returns. They conclude that the "contingent liability arising from potential pressures on government to compensate pensioners for the losses they suffer as a result of poorly performing pension fund sector is 102% of GDP".

Another interesting approach is that taken in Van de Coevering et al (2006), which tries to estimate the economic and social welfare impacts of UK pension reforms, in particular, the impact of the introduction of a system of low-cost personal accounts on those who are currently not saving for retirement. It follows Pension Commission (2004) in arguing that individuals on different levels of income will require different replacement ratios (decreasing with the level of income). Personal accounts are held to improve individual's welfare as they should help people move closer to their 'target' replacement rate in two ways - (i) 60% of the contributions to personal accounts are assumed to be new saving and this makes a direct advancement towards achieving 'adequacy' of retirement income, (ii) 40% is switched from existing savings, but under personal accounts administrative costs are lower and so each £1 transferred in more 'efficient' in terms of achieving the target replacement. However the authors caution that their estimates are highly sensitive to the assumptions on discount rates/rates of return on personal accounts and on the latter's management costs. Furthermore they are very dependent on the target replacement rates used.

By contrast, Falkingham & Johnson (1995) is an example of the simulation variant – as it does not study a legislated reform, but rather simulates the effects of a possible reform. The authors present the results of a modelling exercise which replaces the current (NI) pension system of the UK with a unified funded pension scheme (UFPS), whereby an individual builds up a personal retirement fund which is used to buy an annuity upon retirement, supplemented by a system of annual tax-financed capital transfers to people with low incomes or not in the labour market. They conclude that their proposed system would improve replacement rates while still costing less. However as the authors stress their comparisons "are between a mature NI system and a mature UFPS" and this "ignores fifty years or more of the transition between systems, and the costs involved in the transition process".

3.33 Studies assessing the influence of changes in the system's population

Another approach to analyse the effects of pension reform is to impose the same pension structure on different populations at a given point in time, or else look at the effects of a pension system on different populations at different points in time.

Atkinson et al (2002) is an example of the former approach. The authors examine the implications of a European Minimum Pension (EMP) using a Europe-wide tax-benefit microsimulation model (EUROMOD) to determine the distributional impact of such a reform in five Member States (comprising 70% of the Union's population). This minimum pension would take the form of a non-means tested income supplement if income from pension sources falls short of a specified level "set at the same level in each country in terms of purchasing power parity exchange rates".[89] As shown in Table 3.12, pensioners in the UK and Ireland would be the most likely to gain from the introduction of such a measure (between twice or three times more likely to benefit from this policy than pensioners in France and Germany), pinning this down to "the relative generosity of existing pension payments compared with the EMP, and the coverage of the existing pension systems".

The authors, however, point out the difficulty in arriving at a conclusive assessment of setting this seemingly standard anti-poverty policy. The policy had "a highly uneven effect across countries", despite that a common poverty line was used.[90] In particular they concluded that "different assumptions about the needs of different households, and about the comparison of purchasing power, can change significantly the priority attached to different groups and our view of the differential impact across European countries". The situation becomes even more complex if one wants to continue to track the impact of this policy over time, when the targeted poverty population can be expected to change significantly. At least, the simulation of a non-means tested scheme simplifies matters a bit, as one does not have to worry about incorporating the impact that means-testing has on economic behaviour over time.

Table 3.12: Aggregate impact of the EMP

	France	*Germany*	*Ireland*	*Italy*	*UK*	*Total*
% of pensioner households who gain	29.1	20.5	66.4	44.4	57.6	**37.5**
Average % change in household income	0.7	0.6	1.7	1.5	0.9	**0.9**

Source: Atkinson et al (2002).

Soede et al (2004), by contrast, includes a simulation which is an example of how to impose the same pension structure on different populations at different points in time. The authors, in one of their scenarios evaluating the future of European welfare states, look at how

[89] Note that while the 'absolute' level of this guarantee is equal across the five countries studied in this paper, the pension as a proportion of mean income is different.

[90] Fisher (1970), a study of the adequacy of minimum old-age pensions across ILO countries, had warned 'against the making of sweeping statements and generalisations or the ranking of countries in any but a formal sense'.

ageing, by itself, would affect the levels of poverty, income inequality and government spending between 2000 and 2025. Essentially they evaluate what would happen were pension systems to remain unchanged over the next quarter of a century (ignoring already legislated changes to pension systems). Their analysis shows that the cost of pension provision would increase significantly,[91] while poverty and income inequalities would increase slightly.[92]

International comparisons are not the only example of applying a pension system's rules to different populations. In effect, any study that looks at the impact of a pension system on different subsets of a population does this. Of particular relevance are gender assessments of pension reform, particularly those of systemic reforms. ILO (2003), which looks at the gender dimension of social security reform in Central and Eastern Europe, is an example of such a study. It concludes that "the first decade of transformation brought greater losses of pension protection for women compared to men".

Country-specific studies also present interesting variants of this approach. For example, Bottazzi et al (2006) examines the effects of pension reforms in Italy on different cohorts of workers, as changes were phased in. They find that after the reforms the replacement rate of those with over 18 years of contributions before 1995 was relatively unchanged, but younger workers faced cuts of over 20%. Quite worryingly they find that while these workers "have revised expectations in the direction suggested by the reform…the adjustment is far from complete' and suggest that "in the coming decades a problem of inadequate savings could emerge for the cohorts most affected by the reforms".[93] Bridgen & Meyer (2005) examine the savings level required by a group of seven 'risk biographies' in the UK – such as people with child care responsibilities, intermittent employment, self-employment and redundancy. In doing so, they show the extent to which the same pension system can fulfil its goals of income replacement and poverty replacement when faced with different individuals. This research indicates that individuals facing social risks "face savings rates significantly above those currently paid by most employees" in order to guarantee an adequate income during retirement.

In another paper published in 2005, Bridgen & Meyer study the impacts of the recent shift in UK occupational pension schemes from DB to DC, by simulating the pension

[91] Contribution rates would need to rise by up to 6 percentage points for deficits not to widen.

[92] However, interestingly, the situation in Mediterranean countries would show an improvement, on the basis of increased female participation in formal labour activity.

[93] Ferrera (2006), while agreeing with the conclusion of most studies that younger Italian workers are particularly at risk, also adds that the Italian system will become "more similar to the British system in terms of inequality" and this will put at risk the unskilled and women. He argues that "if Italian workers could be made more familiar with the British situation, many of them would probably opt for sticking to the old system".

entitlements of five hypothetical employees assumed to be working full-time on average earnings. Two of them are lifetime members of final-salary contracted-out occupational schemes in the private sector (but one of them changes jobs in line with the current average level of job mobility). Another two workers pay into typical occupational DC schemes, with one of them being contracted in the State Second Pension. The other worker is assumed to depend on the state alone. The paper finds that there is a significant gap between the pension entitlements of workers with access to DB and DC schemes, but they are much better-off than those who depend on state pensions alone (who would end up in relative poverty).

Finally, one finds examples of studies which simulate possible changes in pension system rules on simulated populations. Kotlikoff et al (2006), for instance, examine "the living standard impacts of immediate and permanent 30 percent and 100 percent cuts in Social Security benefits" to "illustrate the dependency of the (US) population on Social Security and to help policymakers calibrate the cost to Americans of this form of policy adjustment". They simulate their policy change on 14 stylised households that differ with respect to their marital status, annual labour earnings, assets, housing and college expenses. The main conclusion is that "learning early that one's benefits are to be cut can make a big difference to a household's consumption-saving response and to the associated retirement living standard reductions". The cuts impact more dramatically on lower income households, with a 30% cut in benefits, that is first learned about at age 30, resulting in retirement living standards falling by one quarter for low earners, as compared to just 5% for the highest earners

3.34 Studies assessing changes in both pension system's structure and population covered

Dynamic microsimulation models monitor how changes in both the population and the structure of the pension system affect income distribution and poverty. Population ageing has been one of the main factors behind the recent flourishing of this field. Harding (2006), while describing the development of a dynamic microsimulation model for Australia, NATSEM, outlines 9 other models which have been used across the world to analyse effects of pension reforms. Dekkers et al (2009) show initial results from a dynamic microsimulation model (MIDAS) which is being developed for Belgium, Germany and Italy. The authors try to evaluate the impact on pension adequacy of recent reforms in these countries. They find that "in the three countries, the risk as well as the intensity of poverty pertaining to pension benefit recipients increases at first, and then decreases again". The size of the impact is strongest in Italy, most probably reflecting the stronger link between earnings and benefits introduced by the transition to an NDC system.

However, to date, dynamic microsimulation models have been mostly used to conduct country-specific studies. Goodman et al (2007), for instance, assess the prospects for pensioner poverty in the UK up to 2017-18 in view of the pension reform legislated in 2007. The authors find that despite that the private income of the elderly should continue rising significantly and in spite of the measures taken to increase state pension generosity, relative pensioner poverty will stop falling and will remain fairly stable.[94] A similar example is Fonseca & Sopraseuth (2006) which looks at the distributional effects of pension reforms in France and Italy. The authors find that both reforms redistribute welfare unevenly, with high skilled workers being the primary winners of the French reform, while unskilled workers and self-employed individuals are the main losers of the Italian switch to NDC. Flood et al (2006) assess how the income of Swedish Baby Boomers should compare with that of other generations, particularly in light of the move towards NDC in Sweden. Their main suggestion is that there will be "new and large poverty in Sweden among the very old in the future", but that the Baby Boom generation in Sweden should not get a dramatic reduction in income, immediately after retirement, especially if individuals delay retirement to age 67. The authors, however, report that "as time passes the indexation of the pension system erodes the purchasing power of public pensions, resulting in a lower relative earnings as well as a higher incidence of poverty amongst the old".

Soede et al (2004), by contrast, while not using dynamic microsimulation, develop a static model[95] to study the distributive consequences of population ageing in six representative European countries,[96] while simulating the impact of various pension reform policies. Basically the study utilises Eurostat's household projections till 2025[97] and imposes the current welfare system to show how inequality, redistribution and poverty rates change due to ageing. The authors then simulate the effects of 4 scenarios (see Table 3.13): unchanged policies, achievement of Lisbon employment targets, pension reform scenario,[98] institutional reform (countries make choices among 8 different policy options trying to maintain their

[94] However this study fails to take into account properly the positive effect that less tight eligibility conditions to qualify for the full Basic State Pension could have, as it assumes that individuals are constantly in employment. In reality a lot of women stand to gain considerably.

[95] As Soede et al (2004) point out, "there are two possible approaches for exploring future poverty, income inequality and redistribution processes". The first, dynamic microsimulation involves a year-to-year estimation of income for each person in a survey based on their projected personal characteristics and tax/benefit systems. The second, static microsimulation "implies the transformation of incomes according to projected average future income developments, diversified for each socio-economic group", with the sizes of the groups adjusted by reweighting in line with demographic projections.

[96] The countries are Germany, France, UK, Italy, Denmark and the Netherlands. They were chosen as being representatives of particular types of welfare systems.

[97] Limiting the study to 2025 is a major weakness, as the peak of ageing occurs after that date.

[98] This simulates the changes envisaged by EPC (2006).

regime type unchanged). The study finds that current pension reforms should result in a significant change in inequality, but if countries opt to change their regime type by enacting broader reforms there would be a notable increase. The authors note that increasing labour participation helps improve the situation, but does not result in financial sustainability. They conclude that "a policy focusing on financial sustainability is likely to lead to a substantial increase in poverty among the elderly in the future".

*Table 3.13: Poverty rates (%) among the elderly under various scenarios**

		Unchanged policies	*Lisbon strategy*	*Pension reform*	*Institutional reform*
	2000	*2025*	*2025*	*2025*	*2025*
Netherlands	10	11	9	9	19
Germany	13	14	13	15	21
France	18	19	18	25	25
Italy	20	24	22	26	24
UK	28	28	28	35	41

** These scenarios are respectively (a) unchanged policies – nothing (i.e. pension generosity, employment, etc) changes except demography; (b) Lisbon strategy – countries achieve the employment targets set in Lisbon; (c) pension reforms – the change in pension generosity set out in EPC (2006) takes place; (d) institutional reform: countries adopt a number of pension reforms intended to maintain their regime type unchanged.*

Source: Soede et al (2004).

Ferraresi & Monticone (2009) uses the same approach as Soede et al (2004) but extend the analysis to another four countries (Spain, Luxembourg, Latvia and Poland) and cover the period up to 2050. Their model is also superior in that it allows for the interaction between ageing and macroeconomic developments, and can be modified to reflect the latest demographic projections. They find very interesting divergences between the projections of theoretical replacement rates made by the ISG and the pension spending projections made by the EPC, and show that despite reforms, and projected improvements in labour participation, contribution rates faced by future working age generations will have to rise substantially.

Another cross-country approach is taken in Economic Policy Committee (2006 & 2009), which projects state spending on pensions for EU Member States. These projections take into account both changes in the population of pension benefit recipients and also changes in pension systems structures, such as reforms to early retirement schemes, parametric changes to PAYG systems, and the like. On the basis of these projections, the average benefit ratio was computed – relating the average pension to output per worker (an approximation of the average wage). In the EU27 countries this is set to decline by more than a quarter by 2060.

Dusek & Kopecsni (2008) study in an innovative way the effects of pension reforms since the 1990s in Hungary, the Czech Republic and Slovakia. They calculate what they call "the social security wealth" of different cohorts of workers by estimating the difference between the present value of expected future benefits and contributions promised to workers under pre-reform and post-reform legislation, and carry out the computation separately for men and women and for representative workers with different levels of education. They find that the reforms "affected different cohorts and education groups in quite peculiar ways". For instance, reforms in Hungary favour future working age individuals, while those in Slovakia cut the social security wealth of women, particularly those with low education, while raising the generosity of the system for young men with university education.[99]

3.35 Considerations on the reviewed studies on effects of pension reform

The main contribution of the reviewed studies is that they look more broadly at the effects of pension reform, beyond fiscal considerations, and try to delve deeper into the implications that policy changes might have. These studies show the other side of the coin of pension reform (the one that has not tended to be the primary focus of most reforming governments) – by indicating how changes in pension systems or in the population served by the pension system could affect poverty risks and relative income conditions of the population aged 65+. Static studies have sought to quantify the extent to which pension reforms could affect income conditions, while dynamic studies have qualified these results by providing feedback from the reforms and accounting for projected changes in population characteristics. Moreover some of the reviewed country-specific studies were interesting as they shed light on the different kind of income risks faced by individuals affected by systemic pension reform.

That acknowledged, one is still left with a rather incomplete picture. As with the plethora of income survey data examined in Chapter 1, the evidence provided by existing studies on the effects of pension reform lacks structure and fails to provide a holistic assessment of reforms. In most cases, after going through these studies, one is left without a clear opinion of the link (if any) between the capability of a pension system to achieve its goals and the fiscal costs of it doing so. In most studies, one fails to understand precisely the benchmarks against which to evaluate the impacts of reform. These studies do not start by setting out the current achievements of pension systems, and assessing how reforms could affect these achievements. Rather, they tend to focus on one particular aspect, and so do not

[99] In Chapter 6 we find similar results of the reforms' effect on pension wealth in these countries.

allow one to get a complete view of the possible implications of reform. Only in a few cases, such as Hering (2006) and Soede et al (2004), is there an attempt to categorise pension systems,[100] but even then, authors do not assess how reforms might change the relative achievements of each category.

In most cases existing studies fail to answer the crucial question which is of interest to policymakers – i.e. will the new systems prove long-lasting given the changes they introduce and their impacts on the achievement of pension system goals. To answer such a question, one needs to understand better the interaction of future population characteristics (such as increased longevity) with reformed system rules; and compare this with the current situation, in order to understand where potentially risky departures from current system achievements might arise. This requires a clear understanding of current system achievements, combined with clear measures of how these achievements could be affected by reforms.

3.4 Conclusion

This Chapter has sought to describe the main changes in European pension systems which occurred since the 1990s. It divided reforms into two branches: parametric and systemic, and explained how these differ not in the implications on generosity or financial spending but rather in terms of the allocation of risk between the state and the individual. The Chapter also outlined the causes for the reforms, pointing out that in most cases the main considerations were financial (and in some cases reflected short-term financial problems). Conversely the impact of reforms on the capability of pension systems to achieve their aims has tended to be ignored. This does not mean that there have not been studies trying to assess the welfare implications of pension system reforms. This Chapter has, in fact, reviewed several of these studies, but even these studies suffer from a number of problems, as very few have attempted to understand the link between system outcomes or how reforms could change the relative achievements of different types of pension systems. The following Chapter will show how this defect stems from the lack of a clear definition of sustainability, based on the goals which systems are set to achieve. Any assessment of pension reform must start with clear benchmarks against which to evaluate the impact of reforms. Unless these benchmarks are set, it is difficult to understand the link between different system outcomes and judge comprehensively the effects of pension reforms, be they parametric or systemic.

[100] The categorisation method is, however, based on institutional features, and as Chapter 2 has shown this is not the optimal way of approaching this issue.

PART TWO

ASSESSING THE SOCIAL SUSTAINABILITY OF PENSION REFORMS – A FRAMEWORK

4. Defining a broader concept of sustainability

Having reviewed the pension reforms made in Europe since the 1990s and a number of studies on their effects, one feels that both reformers and those studying reforms had a very narrowly defined concept of sustainability, where adequacy is seen as a separate (and contrasting) aim to sustainability. This Chapter will evaluate critically this sustainability framework, arguing that this criterion is seriously lacking as it fails to take into account the goals of pension systems and the reasons why they were established in the first place.[101] By adopting a narrow vision of spending on pensions, this approach fails to take into account potential feedback effects on fiscal spending from the impact of reforms on pension system adequacy. This Chapter will seek to show that in order to assess pension reforms; one needs to adopt a much wider sustainability framework that encapsulates both pension system adequacy and fiscal sustainability. In order to do so, this Chapter will review the various indicators currently in use to evaluate pension system adequacy, and relate them to the aims of pension systems. This will be used to develop a concept of social sustainability for pension systems.

4.1 Defining sustainability

While modern consumerist lifestyles seem to be propelling everyone to focus solely on the immediate present, policymakers and academics have increasingly become interested in being forward-looking and finding definitive solutions to problems and issues. This has led, on the one hand, to a rapid expansion of modelling techniques (seeking to understand what might happen in the future) and on the other, to the development of a plethora of sustainability indicators. For instance, in public finance, not only has there been large interest in developing fiscal models, there also exists a significant literature on measures of fiscal sustainability (such as the cyclically adjusted budget deficit and generational accounting). Pension policy has not been immune to these trends. Spurred by the approaching ageing transition, academics and policymakers sounded the alarm about current pension systems. The previous Chapter outlined how the PAYG scheme of financing pensions ran out of favour in the 1990s and policymakers around the globe started to conceive state pensions as a grave future risk. Higher projected spending on pensions was seen as clear evidence that current pension policies were not 'sustainable'.[102]

[101] These goals were set out in Chapter 1.
[102] For instance, World Bank (1994) espouses this philosophy completely.

Sustainability is usually conceived as a state which can be maintained over the foreseeable future. In public finance, sustainability has been defined in many ways but the theoretical framework adopted by the different authors is underpinned consistently by a representative agent model where government has to fulfil an intertemporal budget constraint and, in every time period, a static budget constraint.[103] Set out in this way, these constraints imply that to be solvent the present value of future surpluses must exceed that of future deficits enough to cover the difference between the initial debt and the present value of terminal debt. Under assumptions of rationality, the latter needs to be zero (as no one will want to hold government bonds at some infinite point in the future), and so this boils down to saying that future fiscal policy must ensure that the stock of debt is repaid.[104] Caldarelli et al (2000) "translate" this as "those bills left unpaid by current generations must be paid by future generations…this is the hard message of the government's intertemporal budget constraint".

Public pensions have been singled out several times as being one of the main obstacles towards achieving long-term sustainability. Thus for instance, in October 2006, the European Commission published a communication to the European Council and the European Parliament where it noted that "in the coming decades, the size and age-structure of Europe's population will undergo dramatic demographic changes…this will make it difficult for Member States to maintain sound and sustainable public finances in the long-term".[105] Similar statements have been made by several international institutions, like the World Bank, IMF and the OECD. As a result, fiscal sustainability has tended to be the one measure of sustainability considered by policymakers when making reforms.

Hauner et al (2007) present the standard fiscal sustainability assessment of pension policies made by international institutions. The authors assess the (pre-financial crisis) fiscal sustainability for each G-7 country through two indicators (see Table 4.1).[106] The 'debt target primary gap' measures the difference between the actual fiscal balance and the fiscal balance required to reach a target level of gross public debt-to-GDP in a certain year. The 'intertemporal primary gap' measures the change in the fiscal balance required so that the present value of future balances is equal to the current level of debt – i.e. it measures what the current balance needs to be so that debt stays always at the current level. This study suggests

[103] See Chalk & Hemming (2000).
[104] This is known as 'weak sustainability' in economic literature, whereas 'strong sustainability' requires that the debt to GDP ratio is held constant. The Maastricht criteria adopt the latter definition. As shown in Chapter 3, some authors, such as Hills (1995), have argued against this depiction of PAYG schemes.
[105] European Commission (2006).
[106] These are based on a seminal IMF paper, Chalk & Hemming (2000), which contributed greatly towards the sustainability indicators used by the European Commission.

that one should not just focus excessively on the size of projected increases in age-related spending. For instance, even though Canada faces a much higher rise in spending than the UK and the US, it requires very little fiscal adjustment on account of its pre-funding of pension promises and low starting stock of net debt.

Table 4.1: Adjustment (% of GDP) required to achieve fiscal sustainability

	*Debt Target Primary Gap**	*Intertemporal Primary Gap**	
		Net Debt	*Gross Debt*
Canada	-0.5	-1.4	-2.2
France	-3.5	-3.4	-4.0
Germany	-2.1	-2.7	-3.0
Italy	-2.5	-1.7	-2.2
Japan	-9.0	-6.2	-7.9
UK	-3.6	-4.8	-4.9
US	-6.1	-6.9	-7.3
Average	*-3.9*	*-3.9*	*-4.5*

** The 'debt target primary gap' measures the difference between the actual fiscal balance and that required to reach a target level of gross public debt-to-GDP in a certain year. The 'intertemporal primary gap' measures what the adjustment in the current balance needs to be so that debt as a % of GDP stays always at the current level, either in net or gross terms.*
Source: Hauner et al (2007).

Schneider (2009) is another example of this approach. The author argues that "the larger the decrease in expected spending on public pensions in 2050 between two base years, the more successful a pension reform the country achieved (after controlling for other factors, such as demography)", and concludes that governments seem to be content with current levels of pension spending and only reform their pension systems "when faced with the threat of escalating expenditures".

The approach of achieving sustainability solely by cutting future spending is, however, increasingly being seen as simplistic. While there is consensus that ageing populations are a challenge for pension systems, the achievement of reduced growth in pension spending cannot be seen as the definitive solution to ageing. As Zaidi (2006) points out "policy-makers need to remember that pensions were not introduced by chance".[107] Spending on pensions is but a means to an end – the reduction of poverty and income replacement during retirement. Thus while spending is an important constraint, having low spending should not be elevated to the status of an objective. A pension system is not successful just because it involves little government spending – a successful pension system is that which achieves its goals with the least cost. Thus when assessing reforms one cannot solely dwell on their impact on spending

[107] See Ove Moene & Wallerstein (2003) for a discussion of why public pensions were set up – namely whether they represent a struggle for redistribution or a desire to have protection against particular risks.

but must rather look at a bigger picture that includes the impact of reforms on the capacity of the system to achieve its set goals.

Howse (2004) argues that most pension reformers are constrained by the belief that "the level of public expenditure as a proportion of GDP is already approaching the limits of political acceptability and economic efficiency" and that thus it is unfeasible to try to maintain the current situation by increasing taxes or pension contributions or by using public borrowing as a way of funding an increasing negative balance on the PAYG pension scheme. However, he argues that even if this were correct, this "does not mean, of course, that the policy task is simply that of ensuring that these limits are not transgressed", but that "the real problem for governments is how to ensure that people have adequate income in retirement without transgressing these limits". By shifting the costs of providing retirement income off-budget, governments will have achieved nothing substantial. This is the main failing of standard fiscal sustainability measures. They fail to incorporate the feedback effects from pension reforms. Pension spending may be cut, but unless individuals accommodate this by lowering their standard of living during retirement or by finding alternative sources of income, the main effect of reforms could be to create pressures on other areas of government spending, resulting in no overall decline in total outlays.

This importance of this argument is increasingly being recognised. In its 2006 report on long-term sustainability, the European Commission notes that while declining pension generosity can contribute positively to fiscal sustainability, "such a decrease may raise concerns about the adequacy of public pensions that could translate into pressure for higher public spending". The report also acknowledges that there is no great escape by simply reducing public responsibility and recognises that "the risks to public finances will crucially depend on the reaction of individuals regarding their future retirement arrangements".[108] Aon (2007) puts this more starkly; "The state pension will be the primary source of retirement income for most Europeans. If this is inadequate, political pressure will be brought to bear on European governments. As old people form an increasingly large proportion of the population and have a higher propensity to vote in elections, this pressure will be difficult to resist."

Holzmann & Hinz (2005) present the revised World Bank position on pension reform, moving away from the three pillar approach championed by the Bank in the 1990s. Besides the original three pillars, the Bank now recognises the need for two additional pillars; " a basic (zero) pillar to deal more explicitly with the poverty objective and a nonfinancial (fourth)

[108] European Commission, DG for Economic and Financial Affairs (2006).

pillar to include the broader context of social policy, such as family support, access to health care, and housing." Also while beforehand the second pillar was seen as set up in close resemblance to the one in Chile, the Bank concedes that this individual savings account "can be constructed in a variety of ways".

The paper also states that:

"The primary goals of a pension system should be to provide adequate, affordable, sustainable, and robust retirement income, while seeking to implement welfare-improving schemes in a manner appropriate to the individual country:

• An adequate system is one that provides benefits to the full breadth of the population that are sufficient to prevent old-age poverty on a country-specific absolute level in addition to providing a reliable means to smooth lifetime consumption for the vast majority of the population.

• An affordable system is one that is within the financing capacity of individuals and the society and does not unduly displace other social or economic imperatives or have untenable fiscal consequences.

• A sustainable system is one that is financially sound and can be maintained over a foreseeable horizon under a broad set of reasonable assumptions.

• A robust system is one that has the capacity to withstand major shocks, including those coming from economic, demographic, and political volatility."

This broader concept of sustainability recognises that inadequate pensions are a source of unsustainability and carry with them the risk of reform reversal, particularly if their social impact turns out to be too high.[109] This concept of a long-term solution through which the aims of the system continue to be achieved without putting excessive pressure on future generations of workers could be termed as ensuring the 'social sustainability' of a pension system. In this sense, an effective reform would result in the system being both financially sustainable and still able to achieve its set objectives, and capable of adjusting to shocks in longevity, financial markets and the economy.

Returning again to the revised World Bank stance on pension reform evaluation, one can adopt the concept of financial sustainability as meaning "…the payment of current and future benefits according to an announced path of contribution rates without unannounced hikes in contribution rates, cuts in benefits, or deficits that need to be covered by budgetary

[109] See Mahfouz (2005). Wagner (2005) also concludes that "even the best technically prepared pension reform fails if it does not reflect the preferences of a country and is not credible to its citizenry".

resources".[110] Adequacy, in turn, "refers to both the absolute level (preventing old-age poverty) as well as the relative level (replacing sufficient lifetime earnings) of retirement income that the pension system will provide." As a result, "the goal of any pension reform should be to ensure that all people regardless of their level or form of economic activity have access to the capacity to remain out of extreme poverty in old age and that the system as a whole provides assurances that those individuals who live beyond the expected norms will be protected from the 'risk' of extreme longevity".[111]

This may seem a Sisyphean task, as ensuring fiscal sustainability and pension adequacy have been seen by most reformers as diametrically opposite goals. However, as explained above, both are complementary. Measures which reduce pension system adequacy below the socially sustainable level create fiscal pressures in the long-term, and vice versa. The two need to be considered in conjunction if policymakers are not to face pressures to have to go back on their tracks. Clear examples of this can be seen in Chile (where the Bachelet government addressed the poverty and redistribution issues of the Pinochet reforms) and in the UK (where the New Labour government ended up reversing prime elements of Thatcher's pension policy such as price uprating and contracting-out).[112] The financial crisis has also led many Eastern European countries to reverse some of their previous personal accounts reforms.

Understanding the interdependence between the goals and constraints faced by pension systems is crucial to evaluate correctly the broader effects of reforms.[113] Figure 4.1 presents this graphically. On the right side we have pension adequacy, capturing the twin goals of pension systems described in Chapter 1. Policymakers need to consider the system's adequacy for the average voter – as if a system is not seen as beneficial by the electoral majority it would be voted out. Thus if a system in the future fails to generate adequate income smoothing, there would be pressure for alternative government support during old age. Similarly if a system is not seen as adequate to alleviate poverty, the political pressures that led to the setting up of transfers to elderly people during the early part of the 20th century might re-emerge. The presence of widespread poverty among the elderly in European countries would create pressures for other forms of state financial support.

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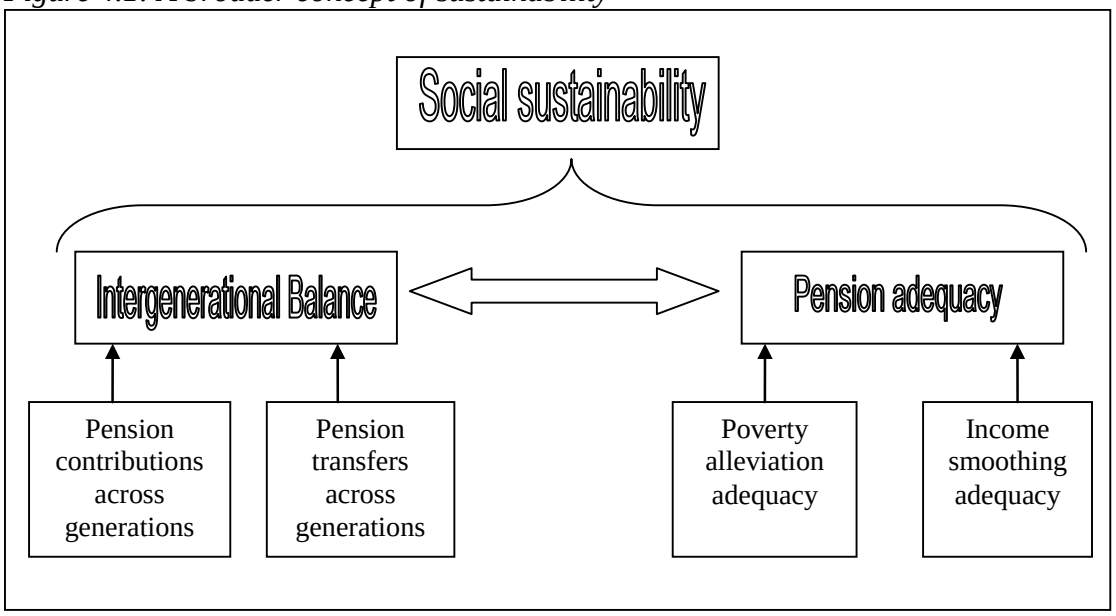
[110] See Holzmann & Hinz (2005).
[111] Ibid.
[112] Taylor-Gooby (1999) singled out the 1980s UK pension reforms as "puzzling" as "reforms damage the interests of substantial numbers of the more vulnerable pensioners who are least attractive to commercial providers", concluding they were prone to be reversed. Barrientos (2006) also argues that poverty reduction is "the missing piece of pension reform in Latin America".
[113] Dekkers et al (2009) evaluates how the financial sustainability assessment made in EPC (2006) translates in terms of the impact on poverty and consumption smoothing.

Figure 4.1: A broader concept of sustainability



On the left, we have the constraint of pension systems – the need for intergenerational balance. A pension system cannot be judged as adequate simply in terms of the poverty alleviation and consumption smoothing it provides to the current generation of pensioners, but also on its impact on different generations.[114] The standard discussions on fiscal sustainability look at the pressures governments face if they impose ever-increasing contribution rates to finance pension transfers. However another source of political pressures is the desire of adjacent generations to enjoy similar living standards. If a younger generation believes a previous generation had much larger pension transfers, it might pressure to reverse reforms.

The pensions system's goals and constraints are interdependent. To ensure social sustainability, reforms need to take into account the four elements set out in Figure 4.1. Moreover reforms need to take into account of the uncertainty in external developments, particularly as regards future economic growth and longevity improvements.[115]

One potential stumbling block of this approach is that as Eckardt (2005) points out "as long as no reliable prospective income indicators exist, which allow one to evaluate the effect of more structural changes on future benefits, the rather short-term policy-making process may further favour the principle of financial sustainability". In this light the next section reviews currently available indicators to see whether they could serve as measures of pension adequacy as defined above.

[114] Draxler & Mortensen (2009) argue for a similar three dimension conception of adequacy, which, however, they fail to operationalise. Similarly Abatemarco (2009) proposes separate indexes to measure pension adequacy, but does not apply this framework empirically.

[115] In reality King (2004) points out "policy debates continue to be permeated by the 'illusion of certainty'".

4.2 Indicators used to evaluate pension system adequacy

The capacity of a pension system to fulfil its goals has been assessed using a number of indicators - the most commonly used being replacement rates.

4.21 Replacement rates as measures of adequacy of pension entitlements

Kolitkoff (1999) argues that "guaranteeing adequate income for workers when they retire…is the most important goal of pension reform" and that pensions "should replace a reasonable fraction of pre-retirement income, i.e., they should be consistent with lifetime consumption smoothing". In fact, the most commonly used pension adequacy measure, the replacement rate, tries to "assess how well older people can maintain their pre-retirement levels of consumption once they stop working".[116] The most economically accurate measure would be one comparing someone's consumption pre-retirement with that post-retirement. Due to data unavailability, this is approximated by comparing incomes collected on a longitudinal basis. Goodin et al (1999), for instance, compute the 'effective replacement rate' of public transfers in Germany, the Netherlands and the US by finding in national income surveys "those people whose principal source of income in one year was market income and whose principal source of income in the next year was public-transfer income" and then "calculate their income in the second (public-transfer-dependent) year as a proportion of their income in the first (market-dependent) year". Bardasi et al (2000) conduct a similar exercise for British individuals retiring 1991-97[117], while Madrian et al (2007) deals with US Baby Boomers.

However, this direct measure of adequacy has its limitations. It is a historical measure – in that one needs to wait until retirement to be able to assess replacement rates. It is an individual measure and thus may not be representative of the whole population. It does not give information on future changes in pension rules – replacement rates would reflect rules as they related to that individual. It is data-intensive and such longitudinal data are not usually available. It does not provide information on poverty alleviation - a replacement rate of 100% for poor individuals would seem generous but would still not reduce the risk-of-poverty.[118] Finally it is a single point-in-time indicator, and does not take longevity into account and how it affects transfers to the individual.

In order to surmount some of these issues, theoretical replacement rates are frequently resorted to. Thus, the Indicators Sub-Group (ISG) of the EU's Social Protection Committee

[116] Munnell & Soto (2005).
[117] See Pension Commission (2004), Chapter 4 pg.138-142 for a similar approach.
[118] Goodin et al (1999), in fact, do not use the 'effective replacement rate' as an adequacy indicator but as a measure of the extent to which welfare systems promote stability over an individual's life course.

publishes "the level of pensions as a percentage of previous individual earnings at the moment of take-up of pensions…for a hypothetical worker, with a given earnings and career profile…and by taking into account enacted reforms of pension systems", shown in Table 4.2.[119] In its 'Pensions at a glance' (2005), the OECD present results for the pension for a hypothetical individual as a share of lifetime average earnings. Similarly in the US, the Social Security Trustees Report includes sets of 'policy model' estimates for hypothetical individuals – namely workers with average earnings equal to 45%, 100% and 160% of the average wage index, and someone who has earned the maximum taxable earnings throughout his career.[120]

Table 4.2: Theoretical Replacement rates - ISG

Gross replacement rate				*Net replacement rate*			
	At 65		*After 10 yrs*		*At 65*		*After 10 yrs*
Estonia	33	Estonia	30	Estonia	41	Estonia	39
Lithuania	40	Belgium	38	Cyprus	52	Cyprus	45
Belgium	43	Lithuania	39	Lithuania	55	Lithuania	49
Germany	43	Cyprus	40	Finland	63	Poland	54
Cyprus	46	Germany	41	Germany	63	Finland	55
Denmark	49	Poland	44	Slovakia	63	Slovakia	NA
Slovakia	49	Slovakia	NA	Belgium	67	Germany	63
Finland	57	Denmark	47	Denmark	71	Belgium	64
Czech Rep	61	Finland	49	Sweden	71	Czech Rep	66
Latvia	61	Czech Rep	51	Ireland	78	France	67
Poland	63	Austria	54	Latvia	78	Denmark	68
Austria	64	France	56	Poland	78	Latvia	NA
Slovenia	64	Hungary	57	Czech Rep	79	Sweden	68
France	66	Slovenia	60	Austria	80	Austria	70
Hungary	66	UK	61	France	80	Slovenia	73
UK	66	Ireland	63	Slovenia	82	Ireland	74
Ireland	67	Portugal	65	UK	82	UK	76
Sweden	68	Sweden	65	Italy	88	Portugal	80
Netherlands	71	Netherlands	67	Malta	88	Italy	NA
Malta	72	Italy	68	Portugal	91	Netherlands	87
Portugal	75	Latvia	68	Netherlands	92	Hungary	88
Italy	79	Malta	72	Spain	97	Malta	88
Luxembourg	91	Spain	82	Luxembourg	98	Spain	88
Spain	91	Greece	86	Hungary	102	Luxembourg	98
Greece	105	Luxembourg	90	Greece	115	Greece	99

Note: Countries arranged in order of the magnitude of their replacement rate. Note that these replacement rates are worked out on a gross and net (of income taxes) basis for somebody who worked full-time for 40 years on average earnings, and retired at age 65.
Source: ISG (2006).

[119] ISG (2006).
[120] See Munnell & Soto (2005).

4.22 Criticisms of theoretical replacement rates

Blondell & Scarpetta (1999) was one of the first estimates of cross-country theoretical replacement rates. However the authors were quick to point out that "there is no such thing as a single pension replacement rate in any national retirement scheme". This because even with the simplest case – flat-rate universal old-age pensions – the gross replacement rate will still differ for individuals as it is determined by their previous earnings, while net replacement rates will be affected by the progressivity of the tax system.

The fact that there is no single pension replacement rate poses significant hurdles to use theoretical replacement rates as pension adequacy measures. To be able to serve this purpose, one would need to know to what extent the hypothetical individual, for whom the replacement ratio is estimated, is representative of the average pension recipient. For instance, the base ISG case specifies a single male on average earnings, employed full-time for 40 years uninterruptedly and retiring at 65.[121] Leaving aside the issue of gender and marital status, the first problem with this base case is very few men work full-time for 40 years and then retire at 65. Eurostat estimates the average exit age from the labour force of men in the EU stood at 61.4 in 2008, and that only 55% of men aged 55-64 were in employment in that year. Moreover, its Structure of Earnings Survey (SES)[122] also indicates that earnings follow a pronounced age profile, rising rapidly at first before then dropping after age 60 (see Table 4.3).

Table 4.3: Average annual wages broken by age across the EU 25 (Euros)

All ages	30,920
Aged less than 30 years	21,129
Aged between 30 and 39 years	31,372
Aged between 40 and 49 years	34,427
Aged between 50 and 59 years	35,200
Aged 60 years and over	32,432

Source: SES 2002, Eurostat.

The ISG is aware of these problems of representativeness and in its first report on theoretical replacement rates noted that "the choice of specific common assumptions about the hypothetical worker used for the calculation, such as the age of retirement and length of working and contribution period before retirement, inevitably implies that only a share of all possible situations are taken into account". Moreover when (as in the ISG) one is trying to

[121] See ISG (2006).

[122] The Structure of Earnings Survey (SES) represents EU-wide harmonised structural data on gross earnings, hours paid and annual days of paid holiday leave which are collected every four years.

conduct cross-country analysis, one introduces further complications as imposing the same assumptions on the hypothetical worker "across the 25 Member States will be more or less representative in each Member State". For instance, the 2006 ISG report indicates that less than 3% of Greek pensioners complete 40 contribution years before retirement and the average career length is 25 years. Thus while the pension system in Greece appears to be amongst the most generous, the poverty rate among the elderly is very high, as in reality people do not get that implied generous pension. In fact, only in 6 out of 25 countries, does one find that, on average, newly retired males contributed 40 years or more prior to retirement.

A further complication for cross-country exercises, such as that of the ISG, is the tendency to impose common economic forecasts. This can be a very important determinant of replacement rates, particularly for NDC systems and personal accounts-based schemes. For instance ISG (2006) set the long run rate of return at 2.5%. By contrast the wage assumptions for some countries, such as Poland, are set higher than this rate. As a result of these awkward assumptions, that imply dynamic inefficiency, the replacement rate of Poland's NDC and funded pension systems is shown to decline substantially over time. In their contribution to ISG (2006), the Polish representatives noted that using a scenario based on historical data on rates of return and wage growth would result in a diametrically opposite result.

These problems with theoretical replacement rates are not specific to the EU. Mitchell & Phillips (2006) assess how replacement rates computed by the US Social Security Administration (SSA) differ for actual and hypothetical earner profiles, using the Health and Retirement Study (HRS)[123]. They find that "replacement rates based on individual earnings lead to higher replacement rates for workers with the median HRS profile compared to the SSA medium scaled profile" (55% versus 48%). Using the HRS, the authors show that, on average, actual HRS workers have substantially lower earnings paths than the medium SSA hypothetical profile, and incorporating this would make the US system 15% more generous to the average worker than reported by the SSA.

Rettenmaier & Saving (2006) also question the replacement ratio definition used by the SSA. Firstly they note that "if the real goal is to maintain consumption during retirement at levels comparable to pre-retirement consumption, pre-retirement earnings are not a very good guide" because "fringe benefits comprise a growing share of pre-retirement compensation, particularly health insurance". Moreover they question the practice of computing replacement

[123] The University of Michigan's HRS surveys more than 22,000 Americans over the age of 50 every two years. This longitudinal study covers a wide variety of issues, such as health and cognitive conditions, retirement plans, income and net worth.

rates by "converting workers' past earnings into today's dollars using the rise in average wages over time" and instead argue that price indexing would be a more accurate measure of pre-retirement resources available for consumption.

Interestingly, there has been little discussion of a major problem of replacement rates – namely their limitation to being single point-in-time indicators. Isolating incomes at a single point-in-time fails to take into account differences in longevity between generations, and also ignores how pension payments change over the period in retirement due to indexation. As OECD (2005) points out, these are very significant factors, particularly when comparing pension policy on a cross-country basis. A country with low life expectancy could 'afford' to pay higher replacement rates to its citizens while imposing the same financial burden on workers as a country with higher life expectancy. Similarly a country where pensions lose their relative value significantly over time, can 'afford' to pay a higher replacement rate at retirement than a country where pension benefits remain relatively constant.

4.23 Moving beyond the theoretical replacement rate measure

One could summarise the previous section by saying that theoretical replacement rates suffer from two problems; their being limited to a hypothetical individual who might not be representative, and their being abstract measures of system generosity that may not play that much a role in determining the living standards of individuals. In fact, researchers that have sought to move beyond theoretical replacement rates have come up with two approaches; (a) create various hypothetical individuals in order to approximate the actual population, and (b) utilise alternative measures using data from general income surveys.

a) Increasing the number of hypothetical individuals

As already pointed out, the US' SSA typically presents results for workers with four different earnings levels. Similarly in its 'Pensions at a Glance', the OECD includes results for workers on six different levels of earnings, from half average earnings to two and half times average earnings. This makes a lot of difference for countries where pension systems do not have a linear earnings-related profile, particularly those with flat-rate pensions. For instance while the net replacement rate for the UK is just 48% compared to an OECD average of 69% looking at average earners, for those on half average earnings the respective rates are 78% and 84%.

Nevertheless while this increases the usefulness of theoretical replacement rates, it does not resolve the problem with the representativeness of the assumptions of a constant relative earnings profile (with respect to the average), no interruptions in the career and

differing entry or exit ages. In this light, the ISG mandated EU countries to also present variants of theoretical replacement rates that depart from these assumptions; namely variants of linear profile of earnings (where earnings grow linearly from 100% of average earnings to 200%, and from 80% to 120%), a third earning profile with a concave earnings profile beginning at 75% of the average and ending at 105% so that working life average earnings are 100% of the average, and a broken career variant where a worker contributes for two separate 15 year periods with a career break of 10 years in the middle. Some countries also present additional variants, departing from the set macroeconomic assumptions.

However while useful, trying to understand the overall impact of a system by having more hypothetical individuals raises the problem of how to weight the different cases to have a synthetic indicator of adequacy. Similarly one would need to consider how the importance of a particular type of hypothetical should be treated over time.

b) Using alternative measures of pension adequacy

Forster & Mira D'Ercole (2005), using OECD data on household incomes, compute 'quasi-replacement rates', defined as "the mean disposable income of persons aged 66 to 75, relative to the mean disposable income of persons aged 51 to 65". A rather wider measure, which departs from the concept of replacement rates, involves computing the relative disposable income of the elderly compared with that of the rest of the population.

The ISG has also complemented its measure of theoretical replacement rates with a number of indicators from income surveys.[124] These include the relative median income ratio between persons aged 65 years or more and persons aged 0-64 years and the median individual pension income of retirees aged 65-74 in relation to median earnings of employed persons aged 50-59 excluding social benefits other than pensions. Another indicator developed by the EU Commission is the benefit ratio which relates the average public pension (computed by dividing spending by the number of beneficiaries) to the output per worker in that economy.[125] Table 4.4 shows that the ranking of the different countries using these four indicators varies widely. For instance, the Netherlands has the fourth-lowest median pension relative to median earnings, but then has the highest benefit ratio. Similarly Spain has the highest gross replacement rate, but its benefit ratio is sixth-from-bottom.

[124] European Commission (2006).
[125] Economic Policy Committee (2006).

Table 4.4: Various measures of pension adequacy used by the EU Commission

	GRR		MP		RI		BR
Estonia	33	Denmark	38	Cyprus	55	Lithuania	8
Lithuania	40	Cyprus	42	Ireland	62	Estonia	11
Belgium	43	Netherlands	42	Denmark	71	Latvia	11
Cyprus	46	Finland	53	Finland	75	Hungary	13
Denmark	49	Latvia	54	Belgium	76	Ireland	14
Finland	57	Austria	58	Estonia	76	Spain	17
Latvia	61	Portugal	58	Portugal	76	Belgium	18
Austria	64	Belgium	61	Spain	77	Malta	18
Slovenia	64	Ireland	63	Sweden	77	Portugal	19
France	66	Lithuania	63	Latvia	80	Slovenia	19
Hungary	66	Spain	63	Netherlands	84	Denmark	20
Ireland	67	Luxembourg	67	Hungary	87	Finland	20
Sweden	68	Malta	67	Slovenia	87	Italy	20
Netherlands	71	Sweden	67	Lithuania	89	Austria	22
Malta	72	Estonia	68	France	90	France	24
Portugal	75	Slovenia	68	Malta	90	Luxembourg	24
Italy	79	Hungary	71	Austria	93	Cyprus	26
Luxembourg	91	France	72	Italy	95	Sweden	26
Spain	91	Italy	74	Luxembourg	101	Netherlands	29

Note: GRR – gross replacement rate, MP – median pension relative to median earnings, RI – relative income of 65+ to that of working age, BR – benefit ratio. A number of EU countries had to be excluded due to them having an incomplete set of indicators.
Source: EPC (2006), ISG (2006), European Commission (2006).

To surmount the issue of having no link between poverty and replacement ratios, the OECD suggests using 'the relative pension level'. This indicates "what benefit level a pensioner will receive in relation to the average wage earner in the respective country".[126] To account for future developments in pension entitlements, the OECD uses 'pension wealth'. The latter takes into account life expectancy, retirement ages and the indexation of pension benefits. Essentially one computes pension entitlements for all the years that an individual can expect to live[127] and discounts them. This discounted flow is then divided by economy-wide average earnings. Thus, for example, in a country where pension wealth is 10, the hypothetical individual can expect to receive flows that are equivalent to 10 years of average earnings.[128]

By contrast, the ISG seeks to address the issue that with replacement rates one is making a single point in time comparison, by supplementing its base case results with an indicator of the replacement rate for the hypothetical individual ten years following retirement. In many cases, the decline is quite substantial, as shown in Table 4.2.

[126] See OECD (2005).
[127] Noting that if entitlements are not indexed to earnings, their generosity drops in relative terms.
[128] Chapter 5 will include a more comprehensive review of the pension wealth indicator.

Dynamic microsimulation models have been used to estimate the original 'economic' conception of pension adequacy – i.e. they should enable one to maintain an optimal consumption level. For example, in the US, the Employee Benefit Research Institute (2006), in order to improve the information available to individuals beyond the synthetic replacement rates provided by the SSA, has developed a simulation model that aims to "produce a far more inclusive and refined projection of likely retirement income". The model projects private pension income, Social Security benefits and net housing equity for Americans born between 1936 and 1965, and then at retirement "simulates 1,000 alternative life paths for each family unit to assess whether the retirement accumulations will be sufficient to pay for both basic (deterministic) and health-related (stochastic) expenditures for the simulated life-path". Similarly in the UK, the Department for Work and Pensions has developed Pensim2 in order to simulate the income of pensioners, particularly to estimate the future distribution of pensioner incomes and the possible distributional effects of changes to the pension system.[129]

Another interesting development that integrates longitudinal studies and microsimulation is Frommert & Heien (2006). They describe preliminary results from two detailed surveys carried out in Germany to acquire information on individual work status and provisions for old age and life courses. In a second step, the individual pension entitlements of respondents are matched with administrative records in order to ascertain the validity of the collected information on past life courses and pension provisions. Finally, the individual work biographies are projected to retirement age using a microsimulation model, taking into account such events as unemployment, long-term illness and caring responsibilities.

Hurd & Rohwedder (2008) propose as an alternative to theoretical replacement rates, what they call "the wealth replacement rate". This involves simulating consumption paths over the remaining life for a household sample observed after retirement, and then assessing whether the resources available to each household could support this consumption path. This approach not only relies on longitudinal data (very difficult to have on a consistent cross-national basis) but is also very data intensive.

Finally, Borella & Fornero (2009) propose the "comprehensive replacement (CORE) rate" - "the ratio between net disposable income when retired and net disposable income when active". Income includes wages, self-employment and private income, as well as cash benefits from the state. They use survey data to compute current estimates and use projections to extend this to 2050. They find that "on a comprehensive basis, different countries provide for

[129] For more details on Pensim2 see Emmerson et al (2004).

almost the same retirement income in relation to pre-retirement income in their own way, as it is the composition, much more than the level, that varies across countries/systems". On the basis of the ISG (2006) projected evolution of theoretical replacement rates they find that CORE rates will remain stable in many EU countries (like Germany and the UK), fall substantially in France and Poland and improve significantly in Hungary.

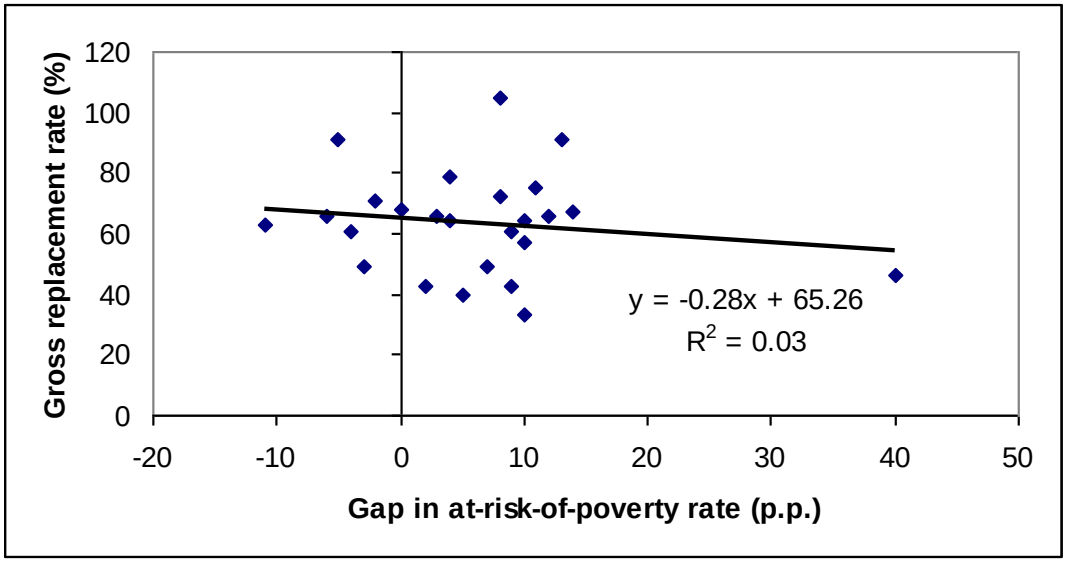
4.3 The link between adequacy measures and pension system goals

The above discussion raises some important points. Though there is great interest in measuring pension adequacy, there has not yet been a systematic attempt to define what indicators should be measuring. There appear to be two lines of thought; (a) defining adequacy in relation to someone's previous earnings, (b) assessing adequacy in relation to contemporary income. Both concepts are valid – the first reflects the system goal of consumption smoothing while the latter reflects the goal of poverty alleviation. The other major undecided point is whether a measure should capture the theoretical generosity of a system or else the actual generosity of the system. Some would argue that a measure of generosity needs to keep the metric constant and look at how a system performs for a standard person under unchanged conditions. This is partly justified in that actual economic behaviour will be affected by generosity (so workers in Greece have shorter working lives because their system provides incentives for them to do this). However it is debatable how much such a theoretical measure is useful to study how pensions affect pensioner poverty.

An indication of the limited representativeness of the ISG replacement rate is that fails to explain the gap between the risk-of-poverty of the elderly and that of the 15-64 population, see Figure 4.2. Conversely, as can be seen in Figure 4.3, there is a good degree of correlation between the gap in poverty rates and the level of relative income. This correlation remains relatively strong even when one excludes the data for Ireland and Cyprus, the two points at the far right of the cross-plot. The problems faced by the theoretical replacement rate become also very evident when one considers that countries like Greece, Spain and Portugal, which all have a relatively significant positive gap in poverty rates, are shown to have a very high theoretical replacement rate while income surveys reveal that the median pension is relatively low.[130] If measures of pension adequacy are meant to shed light on the risk-of-poverty among the elderly, such considerations are of particular relevance.

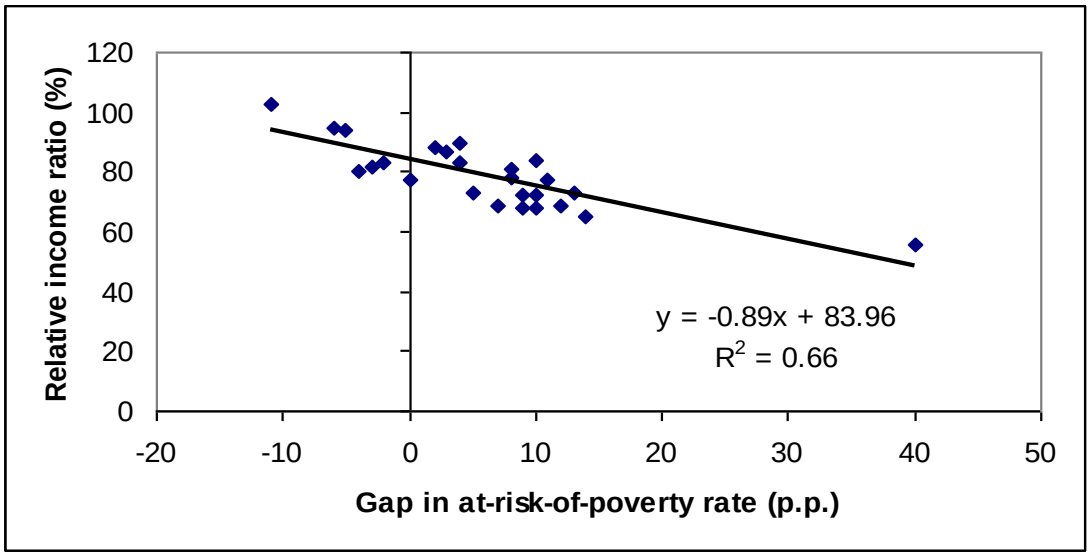
[130] There is a gap of 45 percentage points between the theoretical replacement rate and the median pension for Greece, a gap of 28 percentage points for Spain and 17 percentage points for Portugal.

Figure 4.2: Gross replacement rate against the gap in the at-risk-of-poverty rate (2005-07)



Note: The gap in risk-of-poverty measures the (percentage point) difference between the risk-of-poverty faced by the 65+ and that faced by the 15-64. The gross replacement rate is the percentage of former wages replaced by pensions for a hypothetical full-career worker.
Source: Own analysis using EU-SILC (2005-07) and ISG (2006).

Figure 4.3: Relative income ratio against the gap in the at-risk-of-poverty rate (2005-07)



Note: The gap in risk-of-poverty measures the (percentage point) difference between the risk-of-poverty faced by the 65+ and that faced by the 15-64. Relative income compares the median income of the 65+ with that of the 15-64 in each country.
Source: Own analysis using EU-SILC (2005-07).

The adequacy measure to be adopted depends crucially on the researcher's aims. Someone interested in looking at poverty trends would define a replacement rate in terms of current average earnings of all workers and adjust it for the particulars of the typical retiree (or adopt a number of cases to approximate the characteristics of the recently retired population). A researcher looking at retirement incentives could stick to a theoretical replacement rate

worked out for a hypothetical worker. More crucially if one is concerned about the overall adequacy of pension systems, one cannot simply restrict analysis on a single-point-in-time measure like replacement rates, particularly given the impact that longevity improvements have on both pension system aims and constraints.

4.4 Conclusion

This Chapter has sought to develop a new concept of sustainability which goes beyond the standard fiscal sustainability notions adopted by most pension reformers. In fact, this Chapter argued that fiscal sustainability cannot be achieved without ensuring pension system adequacy. Ageing will increase the need to have adequate retirement income, and simply placing such provision off the government budget is no guarantee that state spending will not increase. This is evidenced by the clear change in the World Bank's stance on pension reform, which now acknowledges that a reformed pension system needs to still ensure poverty alleviation and income replacement for broad sections of society. Besides striving towards these twin goals, future pension systems need to generate intergenerational balance, both in terms of the size of pension transfers to adjacent generations and the contribution rates required to finance these transfers.

A reformed pension system needs to be assessed jointly against these four criteria. By contrast, up to now, evaluations of pension reform have either focused on spending considerations or on effects on replacement rates. The latter have been widely used as measures of pension system adequacy. However, as has been shown above, they suffer from a number of important deficiencies, such as lack of representativeness and being limited to single point-in-time comparisons. In order to really assess pension system adequacy, one has to move beyond theoretical replacement rates, adopt different definitions and other indicators, particularly as they seem not to explain differences in the risk-of-poverty among different European countries. The next Chapter will seek to develop four indicators against which to assess simultaneously poverty alleviation, income smoothing, fiscal sustainability and intergenerational balance, thus enabling a multi-faceted evaluation of pension reforms.

5. Developing a multi-faceted framework to assess the sustainability of pension reforms

The previous Chapter proposed that pension reforms need to be assessed jointly against four criteria; namely the future ability of the system to achieve poverty alleviation and consumption smoothing, the size of pension transfers for different generations and the contribution rates required to finance them. It also suggested that theoretical replacement rates would need to be modified to be able to enable this multi-faceted analysis.

This Chapter will propose how this can be done using estimates from the APEX pension entitlement model developed by the OECD. This model, which was developed explicitly with cross-country comparisons in mind, has been used in OECD, EU and World Bank publications on pension policy. Moreover, although not used officially in the ways proposed below, its flexibility enables the use of results in innovative ways that go far beyond the standard theoretical replacement rates comparisons. In conjunction with other data, it can be used to modify theoretical replacement rate indicators to remedy some of the defects described in Chapter 4. After describing APEX in brief, this Chapter will set out the four indicators underpinning the proposed multi-faceted evaluation of pension reforms. However, while this Chapter contains some results from APEX, estimates for the four sustainability indicators will be presented fully in Chapter 6.

5.1 The OECD's APEX Model

The OECD has for several years been involved in the research and analysis of pension policies. This interest culminated in 2005 with the first issue of 'Pensions at a Glance', a publication aimed at assessing public pension policies across OECD countries. This publication is based on results from the APEX (Analysis of Pension Entitlements across Countries) model, adopted by the OECD. Officials from the countries that are modelled collect and send information on their countries' pension and tax systems at the OECD's request. Delegates to the OECD Working Party on Social Policy (who are officials from the countries modelled) advise on modelling procedures and the development of indicators, provide comments on drafts of the OECD's reports and validate results. This model has been used for the World Bank's 'Pensions Panorama' publication which extended the analysis to 53 countries, including some low and middle-income countries. Furthermore, the model has now been adopted by the EU Commission as part of the open method of co-ordination (OMC) in pensions, to help calculate one of the pension indicators monitored by its ISG – namely the prospective change in theoretical replacement rates.

APEX calculates several pension indicators, under a range of different assumptions[131], for hypothetical individuals, such as:

- Replacement rates in gross and net terms (pension benefit expressed as a percentage of pre-retirement earnings; ratios are calculated both excluding and including employers' social security contributions);
- Pension value (pension benefit expressed as percentage of average wage, net or gross);
- Pension wealth (discounted stream of future pension payments using data on country-specific life expectancy) in both gross and net terms.

The indicators assume an individual has earnings which are a constant ratio of average earnings in each career year. Indicators are provided for a continuous range of earnings' levels from 50-250% of the average wage (set according to the OECD's harmonised definition of an average worker).[132] The model includes the most important mandatory and quasi-mandatory private-sector occupational pension schemes in each country (see Table 5.1).

Table 5.1: Pension schemes included in APEX calculations

	Scheme 1	**Scheme 2**	**Scheme 3**	**Scheme 4**
Austria	Targeted	Earnings-related		
Belgium	Targeted	Minimum	Earnings-related	
Cyprus	Social assistance	Earnings-related		
Czech Rep	Basic	Earnings-related		
Denmark	Targeted	Basic	ATP	DC
Estonia	Basic	Earnings-related	DC	
Finland	Targeted	Earnings-related		
France	Targeted	Minimum	Earnings-related	Occupational
Germany	Social assistance	Earnings-related		
Greece	Targeted	Earnings-related	Supplement	
Hungary	Minimum	Earnings-related	DC	
Ireland	Basic			
Italy	Social assistance	Earnings-related		
Latvia	Minimum	Earnings-related	DC	
Lithuania	Basic	Earnings-related	DC	
Luxembourg	Minimum	Basic	End-of-year	Earnings-related
Malta	Targeted	Basic	Earnings-related	
Netherlands	Basic	Occupational		
Poland	Targeted	Earnings-related	DC	
Portugal	Minimum	Earnings-related		
Slovakia	Minimum	Earnings-related	DC	
Slovenia	Targeted	Minimum	Earnings-related	
Spain	Targeted	Earnings-related		
Sweden	Targeted	Earnings-related	DC	Occupational
UK	Targeted	Pension Credit	Basic	Earnings-related

Source: OECD APEX User guide.

[131] Assumptions on macroeconomic developments, such as inflation, can be set according to the wishes of the researcher, while mortality rates as projected by Eurostat and the UN can be used alternatively.
[132] This is explained in the OECD's 'Taxing Wages' publication.

The model, written in STATA, has been provided to the author by the OECD for the purposes of conducting this research. Although research using this model has been published, only officials from the OECD, World Bank and the EU Commission have direct access to this model. Thus the use of this model, validated by national governments but set up centrally by an international institution, for purely academic purposes presents an interesting innovation. The fact that the model was expressly built to enable cross-country comparisons is a big advantage. Moreover since this model will be kept updated along the years, the proposed indicators could be updated regularly. Finally, the fact that this model is already in widespread use among international institutions shows its value for policymaking purposes, and presents interesting prospects for the future use of the proposed indicators.

The version of APEX used in this research is based on the policy parameters for old-age pensions legislated in each country in 2006 (including reforms to be implemented at a later date). It further assumes that the tax system in place in 2006 will remain in place, with tax and social security thresholds being up-rated in line with earnings. The author has modified APEX to reflect pension reforms enacted in Germany and the UK since 2006. Note that the cuts in generosity legislated in Hungary in mid-2009 were not modelled.

5.2 Pension indicators available using APEX

One of the prime advantages of APEX is that when it was being set up in the mid-2000s, the modellers also included parameters of previous pension systems for those countries which had undergone considerable reforms during the 1990s. These include ten EU countries, namely Austria, Finland, France, Germany, Hungary, Italy, Poland, Slovakia, Sweden and the UK. The modelling of the pre-reform and post-reform pension systems in these countries presents an excellent research opportunity. Their welfare systems are significantly different and include examples of all the usually quoted system typologies and also that developed in Chapter 2. This selection includes countries which made parametric reforms (Finland, Austria, France, Germany, UK), those which introduced NDC systems (Sweden, Poland, Italy), and those which introduced a personal accounts system (Hungary, Poland, Slovakia). Thus they represent well the spectrum of reforms carried out in Europe described in Chapter 3.

These ten countries account for 61 million of the 86 million people in the EU27 who currently are aged 65+, 71% of the total. By 2050, according to Eurostat baseline population projections, they will have an elderly population of 100 million, 68% out of the total 148

million in the EU27. Thus an analysis of the reforms enacted in these countries sheds substantial light on the future of pension provision in the EU.

In this section, we will provide examples of the main three types of APEX indicators, chosen in relation to three of the social sustainability dimensions described in Chapter 4:

1. Poverty alleviation adequacy – Change in the net pension level for men who prior to retirement earned half mean wages.
2. Income smoothing adequacy – Change in net replacement rate for men who prior to retirement earned the mean wage.
3. Intergenerational balance – Change in net pension wealth for men who prior to retirement earned the mean wage.

We will be comparing the first two indicators with arbitrary benchmarks, intended to capture possible objectives. The net pension level indicator for those earning half the mean wage will be compared with an entitlement equal to 35% of the average wage.[133] The net replacement rate for those retiring on the average wage will be compared with a benchmark of 60% of previous income. All indicators are assessed at 2005 and 2050. When looking at pension wealth, projected changes in mortality will be taken into account, i.e. individuals will be assumed to live longer in the future.

5.21 Evaluating poverty alleviation

A possible measure of the poverty alleviation function is the net pension level for those on low incomes (here defined as people previously earning half the mean national wage). Note that the net pension level is computed by comparing the pension entitlement upon retirement (after a full career since age 20) with the average wage in that economy. Thus the indicator estimates the relative living standard immediately after retirement of people depending solely on mandatory pensions. Table 5.2 shows the pre- and post-reform net pension levels for men on low incomes in 2005 and in 2050, and the difference between these and the threshold of 35% of current average wages. These estimates indicate that at present mandatory pensions provide a net pension level equal to 35% in all the countries surveyed, except for the UK. Austria and Italy have the highest surpluses. Pension reforms appear to have led to the worsening in poverty alleviation adequacy in many countries. The worst development appears to have been in Poland, where policymakers introduced personal accounts and an NDC first pillar. Sweden and Italy's new NDC systems also result in lower net pension levels. The tighter linking of

[133] Chapter 6 will expand on the choice of this benchmark. At this point, suffice to say that this is a proxy for the poverty threshold adopted by the EU – which is 60% of median disposable income.

benefits to contributions is projected to have a negative impact in Austria, Slovakia and Germany. By contrast, in Hungary and the UK generosity improved, while reforms in France and Finland have left benefit levels for the lower income group practically unchanged.

Table 5.2: Net pension level of men previously earning half mean wages

	Pre-reform (2005)	*Surplus (2005)**	*Post-reform (2050)*	*Surplus (2050)**
UK	29.4	-16%	39.0	11%
Germany	39.7	13%	34.6	-1%
Slovakia	41.8	19%	35.5	1%
France	42.8	22%	42.1	20%
Sweden	44.7	28%	39.0	11%
Finland	45.7	31%	46.0	31%
Hungary	45.7	31%	50.5	44%
Poland	50.0	43%	35.6	2%
Italy	55.9	60%	46.7	33%
Austria	57.8	65%	53.2	52%

Note: Countries ranked according to the size of the surplus pre-reform.
** Surplus between net pension level and 35% benchmark expressed as a percentage.*
Source: Own analysis using APEX.

5.22 Evaluating income smoothing adequacy

The starting situation is relatively similar when one looks at net replacement rates (i.e. pension entitlements at retirement compared with the previous wage income for that individual, net of income tax and social security contributions) for those on the average wage. Net replacement rates, in fact, currently exceed the 60% benchmark in all countries except the UK.

Table 5.3: Net replacement rate of men earning the average wage

	Pre-reform (2005)	*Surplus (2005)**	*Post-reform (2050)*	*Surplus (2050)**
UK	41.1	-32%	43.9	-27%
Sweden	72.5	21%	60.3	0%
Finland	72.9	22%	70.7	18%
Poland	76.0	27%	68.6	14%
Slovakia	76.4	27%	70.9	18%
France	78.1	30%	63.1	5%
Germany	79.5	33%	61.7	3%
Hungary	88.2	47%	101.0	68%
Italy	98.6	64%	77.9	30%
Austria	99.5	66%	90.9	52%

Note: Countries ranked according to the size of the surplus pre-reform.
** Surplus between net replacement ratio and 60% benchmark expressed as a percentage*
Source: Own analysis using APEX.

The reforms impact significantly on most systems' income replacement role. The 'surplus' over the 60% benchmark drops significantly, particularly in Germany, France and Italy. Slightly less pronounced drops are observed for Sweden and Poland.

5.23 Evaluating intergenerational balance

The most useful indicator available in APEX is pension wealth - the discounted stream of all pension payments during retirement. It is expressed as a multiple of the average wage – e.g. a pension wealth of 10 means that at age 65 the individual can look forward to discounted pension transfers equal to 10 times the current average wage. The benefit of this indicator, compared to replacement rates or pension levels, is that it captures the length of time during which pensions will be paid and also any change in the relative value of pensions over time.[134]

Table 5.4 shows the net pension wealth, expressed in terms of the current average wage, for individuals retiring at age 65 on mean wages after contributing for 40 years – or the expected total pension transfer at point of retirement after a full career.[135] Given that replacement rates and pension levels are generally set to decline, it may be surprising that net pension wealth is not projected to drop in many countries. However one must consider that between 2005 and 2050, life expectancy will have increased significantly and in most countries the enacted increase in state pension age is not high enough to offset this.

*Table 5.4: Pre- and post-reform net pension wealth of men previously on mean wage**

	Pre-reform (2005)	*Post-reform (2050)*
UK	4.1	4.8
Poland	6.1	7.2
Sweden	7.0	6.9
Finland	7.1	8.0
Germany	7.3	6.5
Austria	9.2	9.9
France	9.3	8.8
Hungary	9.3	12.3
Slovakia	9.5	9.3
Italy	10.0	9.6

Note: Countries ranked according to the size of the pre-reform pension wealth of men.
** Expressed in terms of the contemporary average wage.*
Source: Own analysis using APEX.

[134] With price indexation, an entitlement defined in relation to the average wage declines steadily over time, as prices tend to grow more slowly than wages. Moreover in countries with sustainability factors, projected changes in dependency ratios also decline the relative generosity of pensions over time.
[135] Note that these calculations are based on Eurostat's mortality projections.

5.3 An alternative approach to measure the financial sustainability of pension systems

This section will describe the theoretical underpinnings of the approach taken in Chapter 6 to assess the financial sustainability of current and future pension promises. No results are presented here.

The usual approach taken to measure the financial sustainability of pension systems is macroeconomic fiscal modelling.[136] This involves making projections of future spending on state pensions on the basis of projected demographic and macroeconomic developments.

While projected spending on state pensions as a percentage of GDP gives an indication of the economic resources being transferred to pensioners, it does not in effect capture the financial burden being faced by working generations. Thus some studies[137] focus on the contribution rate which future generations of workers need to pay to finance the projected spending on state pensions. The idea here is that in terms of financial sustainability what matters is whether the contribution rate will be deemed acceptable by future workers and not be too high a disincentive.

The mathematics of pension systems is fairly simple. In any pension system,[138] the following identity holds:

Total resources transferred to pensioners = Total resources transferred from contributors……(1)

This can be rewritten as:

Average pension X Number of pensioners = Average Contribution X Number of contributors…..(2)

Both the average pension and the average contribution can be defined in relation to the average wage. This reduces identity (2) to:

Gross pension level X Number of pensioners = Contribution rate X Number of contributors…..(3)

Rearranging identity (3), one has:

Contribution rate = Gross pension level X System dependency ratio…….(4)

where the system dependency ratio is the number of pensioners divided by the number of contributors.

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[136] See for example EPC (2006).
[137] For instance, Soede et al (2004).
[138] In a PAYG system, total spending must be equal to contributions plus other government revenue or borrowing. In a funded system, what changes is that the transfers are conducted through sales of financial assets between generations, rather than through taxation or government borrowing.

Thus the higher the pension and the higher the number of pensioners relative to that of contributors, the higher the contribution will need to be. Note that what matters here is the ratio between contributors and pensioners, rather than the ratio between the population aged above state pension age and that of working age. While most people aged above state pension age will be eligible for a pension, it certainly is not the case that all those of working age are contributors. Note that the term 'pensioners' is not equivalent to 'retirees'. People who stop working before state pension age are 'retirees' but not 'pensioners'. One becomes a 'pensioner' only when state pension age is reached.

Discussions on financial sustainability have tended to be framed in view of the above simple mathematical identities. However, while this approach gives an indication of the period-by-period financial balance of a pension system, it may not provide a good indication of the long-term financial burden of a pension system. The gross pension level measures the initial average generosity of pension transfers to different generations, rather than the total generosity of the pension system to one particular generation. To measure the latter, one would need to replace gross pension levels by measures of pension wealth. Thus identity (4) would become:

Contribution required = Gross pension wealth X System dependency ratio……..(5)

Gross pension wealth multiplied by the system dependency ratio would give the number of average wage years required to finance total pension transfers for a generation. For example, if in the UK, on average, future pensioners will have an entitlement equal to 5 years of average wages, and the ratio of workers to pensioners is projected to be 2 to 1 in 2050, that means that in 2050 every worker needs to forgo 2.5 years of average wages in order to finance the total pension transfers. This can then be transformed into a contribution rate by dividing the number of average wage contribution years by the number of years worked.

The advantage of this approach lies in that it looks at the total pension entitlements of particular generations, rather than simply looking at gross pension levels of different generations and ignoring the impact of differing lengths of retirement and of indexation on the gross pension level over time. Thus if the gross pension level is projected to decline, but the length of time in retirement is set to increase, the first approach would show a more favourable financial position than is warranted. Similarly an increase in the pension age not only decreases pension wealth, it also increases the potential number of years worked and thus reduces the contribution rate in two ways. By contrast, an analysis based simply on using projected levels of the gross pension level would ignore this important effect on financial sustainability of increasing the pension age.

5.4 Proposing a set of indicators for the evaluation of pension reforms

Section 5.2 showed some of the most interesting features of the APEX model. It presented estimates of replacement rates, which have been widely used to assess pension adequacy, and also the interesting innovation of pension wealth indicators, which are a significant improvement on replacement rates in that they cover total pension flows. This pension wealth indicator can be modified to derive an adequacy indicator comparing pension entitlements with a general benchmark, e.g, having flows which enable an income equal to 60% of pre-retirement wages throughout retirement. Using measures of net pension wealth in conjunction with measures of net pension requirements presents a significant improvement over the current adequacy indicators used in both cross-country pension system comparisons and in reform assessment literature. Such measures adjust for current and future differences in time spent in retirement between countries and also take into account the full pension transfers during retirement – and not just those immediately after retirement – which again differ according to indexation arrangements and the interplay with minimum income guarantee conditions. Section 5.3, moreover, indicated how gross pension wealth indicators can be used to assess financial sustainability of pension systems in a more precise way than existing measures, particularly when reforms affect the length of retirement but not the generosity of systems.

Chapter 4 suggested that the issue of social sustainability needs to be analysed under 4 different dimensions – poverty alleviation adequacy, income smoothing adequacy, intergenerational adequacy and financial sustainability. To put in mathematical notation, policymakers need to maximise the following objective function:

$$Max\ F(PA, CS)\ subject\ to\ G(IB, FS)$$

where PA and CS are the system's goals - poverty alleviation and consumption smoothing and IB and FS are its constraints - intergenerational balance and financial sustainability.

This characterisation shows that the four elements are intricately linked. Total welfare would be non-optimal if systems fail to maximise poverty alleviation and consumption smoothing and similarly if they fail to minimise pressures on intergenerational balance and financial sustainability. Policymakers who fail to understand this when conducting reforms are running the risk of seeing them unravel.

In order to have a workable assessment method, we require indicators for the system goals which can also be used to compute the system constraints. While, as explained in Chapter 4, many reform assessments were defective because they focused just on one aspect, existing assessments using a number of indicators have also suffered from the major

disadvantage that the indicators were not directly comparable. For instance, the EU's OMC has developed measures of adequacy (prospective theoretical replacement rates) and measures of sustainability (projections of pension spending). However these two exercises are separate, and though based on the same macroeconomic assumptions, their results are hardly reconcilable. By contrast, in our research all indicators will be calculated using the pension wealth estimates made by APEX, so to be internally consistent.

To measure poverty alleviation, we need to assess how a reform has affected the possibility of a system to guarantee a decent standard of living. This is best done by looking at pension entitlements defined as a proportion of the average wage in a country. If a pension provides less than 35% of the average wage, the person depending on just that income will be at-risk-of-poverty. This indicator would be mostly relevant to low-income individuals, who, as Chapter 1 indicated, are the most dependent on this source of income. Conversely the consumption smoothing indicator needs to capture the extent to which pension transfers replace pre-retirement income. Given this definition, the best indicator would be pension wealth expressed as an annual replacement rate, comparing entitlements to one's own relative level of wages, taking into account some benchmark (say 60%) reflecting a desirable replacement rate. In order to increase representativeness, these indicators would be calculated at different wage levels and aggregated according to the income distribution of that country.[139]

Turning to the constraint function, we need measures to assess intergenerational balance and financial sustainability. The former is meant to capture the extent to which different generations of pensioners receive similar transfers. Again the best approach is to have a stock indicator, like pension wealth, rather than a flow indicator such as replacement or pension level rates.[140] Finally as regards financial sustainability, rather than preparing fiscal projections based on macroeconomic modelling, one could simply use aggregated pension wealth in conjunction with demographic and macroeconomic projections to arrive at the implied contribution rate out of average wages needed to finance these transfers.

[139] By contrast in his theoretical paper on measures of pension system adequacy, Abatemarco (2009) proposes that to study poverty alleviation, one should adopt an index defined as the difference between "how much poverty would have been under the hypothesis of an actuarially equivalent pension scheme and how much poverty really is". To study the impact on consumption smoothing he proposes an index which "is obtained from the aggregation, for each income unit, of income gaps at each period after retirement". The latter is very similar to what shall be done in following Chapters. As for the former, we believe that while it is true that our proposed approach may understate time spent in poverty (as pension flows over the years are not constant) we will be able to supply additional indicators to address this issue.

[140] Abatemarco (2009) presents the two options, but does not choose between them. However using replacement rates suffers from one particular defect – it ignores longevity differences between generations.

Basing all the dimensions on the same modelling and indicators presents an interesting innovation and appears to be theoretically appropriate. Thus having a high prospective pension level and replacement rate would maximise the achievements of goals, but it would also maximise (rather than minimise) pressure on constraints, as it would imply more fiscal pressures and imperil intergenerational balance.

To assess the four dimensions, the OECD's APEX model will be used to estimate pension entitlements in net terms initially for a full-career worker with career-long stable relative wages.[141] The full-career assumption will be relaxed in Chapters 8 and 9. The analysis will be conducted using system rules in place prior and post reforms which occurred between 1990 and 2006. Results will be presented for men and women at different wage levels.

5.5 Conclusion

This Chapter has introduced the APEX model – which will provide the data for the proposed assessment of pension reforms. It has shown how the model provides data on theoretical replacement rates, pension levels, and more importantly pension wealth. The model can be run using different macroeconomic and demographic assumptions (thus providing a means to assess the robustness of pension systems to economic and longevity shocks), and assumptions on the level of earnings and length of contributions can be modified, thus providing the scope for a better calibration of theoretical replacement rates. The pension wealth indicator is the main empirical contribution of APEX as it addresses two of the main defects of replacement rates by capturing the effects of benefit indexation post-retirement and of longevity. Pension wealth can be converted into an overall replacement rate and compared to adequacy benchmarks. Moreover it can also be used to assess the financial sustainability of pension systems.

Finally the Chapter has set out the objective function which policymakers should seek to maximise in order to achieve social sustainability. This involves balancing the achievement of system goals while operating within the constraints of intergenerational balance and fiscal sustainability. By using APEX to measure all four dimensions, the proposed approach would be internally consistent while clearly defining the objectives and constraints faced by policymakers in pension provision. The next Chapter will apply this approach to ten European countries which have undergone major pension reforms since the 1990s.

[141] That is if someone starts working at 20 and earns half the mean wage, he would remain in this relative position throughout his 40-year career.

6. Assessing the social sustainability of pension reforms in Europe under the assumption of complete full-time careers

The preceding Chapter introduced a multi-faceted framework to assess the social sustainability of pension reforms. It proposed that policymakers who want to achieve an effective response to the challenge of population ageing need to ensure that reforms enable pension systems to maximise the achievement of their goals while minimising pressure on constraints. This approach will be applied in this Chapter and the APEX model will be used to derive indicators of the four dimensions of social sustainability described in Chapter 5. The ten countries that will be studied cover 70% of the EU's population and span the different pension typologies developed in Chapter 2. They also include examples of both parametric and systemic reforms. This Chapter will suggest to what extent these reforms might, or might not, enable countries to face population ageing in a socially sustainable manner. It must be emphasised that at this stage, the approach, like other existing literature, will assume that there is full-employment and standard full-time careers for both genders. It also assumes that there is complete take-up of minimum pensions and that no private retirement saving is taking place – important assumptions for countries with means-testing and with significant private pension saving.[142] These assumptions, while commonly used, are unrealistic, but they are useful for this intermediate stage of the analysis. Some of them will be relaxed in later Chapters.

The first part of the Chapter will set out the data underlying the social sustainability indicators. The latter will then be estimated for the pre-reform situation – setting out the starting point of what systems are achieving at present. This will be used to give an indication of where the selected countries fit in the pension system typology developed in Chapter 2. The indicators will then be estimated for 2050 and compared with the current situation. This will enable a first assessment of whether reforms are socially sustainable. This, however, presents only one way of benchmarking the impact of reforms. The other approach, developed in Chapter 7, involves comparing the post-reform scenario for 2050 with what would have happened had no reforms taken place.

6.1 Data and assumptions underlying the indicators

Chapter 5 introduced APEX and gave some examples of the indicators it can estimate. This section will explain more comprehensively the assumptions which underlie these calculations

[142] In this research, the main impact is on the UK. Though under the full-career assumption, few individuals would qualify for means-tested benefits.

and present additional data which will be used to compute the sustainability indicators. All modelling will be for single individuals. This may overestimate actual generosity, as many times benefits for couples are less generous than those for two single individuals.

APEX is based on pension system parameters in 2006, but includes legislated changes that are phased in over time. Since 2006, Germany and the UK have legislated significant reforms, which have been modelled by the author.[143] Hungary also made substantial reforms in 2009, as part of an IMF loan agreement, which should reduce pension generosity substantially.[144] These have not been modelled, as some were not yet legislated at the time of writing. APEX models in each country "all mandatory parts of the retirement-income system, including resource-tested benefits, basic pensions, as well as public and compulsory private pension schemes".[145] The standard entitlement calculations assume someone enters the system at the age of 20 and retires after a full career.[146] Note that this implies different career lengths according to the pension ages in the 10 countries, shown in Table 6.1 for 2005 and the legislated levels for 2050. Though, as expected the trend in pension ages is upwards in all countries, it is quite surprising to note that the situation in 2050 will be even less harmonised than in 2005. Then there were only 2 pension ages for men (60, 65) among the 10 countries, while by 2050 there will be 5, ranging from 60 to 68. Similarly for women there were 4 different pension ages in 2005, rising to 5 by 2050. However, by 2050, the pension age gap between genders will have nearly disappeared.

Table 6.1: Pension ages in 2005 and 2050

	2005		*2050*	
	Men	*Women*	*Men*	*Women*
Austria	65	60	65	65
Finland	65	65	65	65
France	60	60	60	60
Germany	65	65	67	67
Hungary	60	55	62	62
Italy	65	60	65	65
Poland	65	60	65	60
Slovakia	60	57	62	62
Sweden	65	65	65	65
UK	65	60	68	68

Source: EPC (2007).

[143] These include increases in the state pension age in both countries and the introduction of wage indexation of the Basic State pension in the UK.
[144] They include a pension age rise to 65, less generous indexation and the removal of a bonus pension.
[145] APEX also includes non-compulsory private systems when they cover at least 90% of employees. This, for example, is the case for Sweden, where the main national scheme for private-sector employees is modelled. The proposed personal accounts system of the UK is not modelled, as its form is yet unclear.
[146] For resource-tested benefits, the model assumes full take-up and that only the income test is binding.

APEX allows the calculation of entitlements for different career lengths. Thus, while in this Chapter, the full-career assumption will be adopted; later Chapters will include calculations for non-standard working careers. However, all Chapters will assume that an individual remains throughout at one point in the relative wage distribution. Thus someone earning twice the average wage at age 20 would also earn twice the contemporary average wage in the year preceding retirement. While this may seem unrealistic, in practice it will make relatively little difference, as contrary to most existing literature, rather than focusing on a single hypothetical individual, this analysis will be based on a balanced set of individuals spread over the wage distribution. Hence, instead of looking at the pension entitlement of a full-career individual who earns throughout his career the average wage, we will compute the aggregate pension entitlement of individuals across the wage distribution earning throughout their careers the same relative wage. This will be done by computing the pension entitlement of individuals at each wage decile of that country, and then compute an aggregate pension entitlement over all deciles.

Table 6.2 presents wage distribution data for full-time workers in Euros in 2002, from Eurostat's Structure of Earnings Survey (SES). They represent the annual wages of workers in sectors C to K of NACE, or most of the private sector workforce in the ten countries, covering 34.6 million male and 14.1 million female workers.[147] These data were preferred to more recent data from other sources, as they cover the same pay periods and sectors, and are based on harmonised definitions. However they exclude part-timers and workers in farming, fishing and the public sector (public administration, health, social work, education). This potentially affects the measure of wage inequality, with the exclusion of public sector workers possibly increasing the degree of inequality and vice versa for that of part-timers. In both cases the effects could be stronger for women who tend to be more in part-time and public sector employment. Lack of an adequate data series for all countries for these categories, however, necessitated their exclusion in this study, as it has in other similar ones. However, Annex 1, which compares these data with more comprehensive national data, shows that the degree of wage inequality implied by these data seems fairly representative.

[147] NACE is Eurostat's classification of commercial activity. Sector C is mining and quarrying, D is manufacturing, E is electricity, gas and water, F is construction, G is wholesale and retail, H is hotels and restaurants, I is transport, storage and communication, J is financial intermediation, K is real estate, renting and business activities.

Table 6.2: Wage distribution for full-time private sector workers in thousands of Euros – annual wage (2002)

a) Both genders (male and female)

Country	Mean	P_10	P_20	P_30	P_40	P_50	P_60	P_70	P_80	P_90
Slovakia	*5.8*	2.7	3.2	3.7	4.1	*4.5*	5.1	5.9	7.1	9.5
Hungary	*5.9*	2.5	2.7	3.1	3.6	*4.2*	4.9	5.9	7.4	10.4
Poland	*7.1*	2.7	3.5	4.2	4.9	*5.6*	6.5	7.6	9.1	12.1
Italy	*25.8*	15.1	16.9	18.4	20.0	*21.9*	24.3	27.4	32.1	39.9
France	*29.4*	15.6	17.7	19.7	21.7	*24.0*	26.7	30.3	35.8	47.2
Finland	*30.8*	19.4	21.8	23.8	25.8	*27.9*	30.5	33.6	38.0	45.3
Sweden	*31.4*	17.8	22.0	24.2	26.2	*28.1*	30.5	33.5	38.3	47.6
Austria	*33.3*	16.9	20.7	23.3	25.7	*28.2*	31.3	35.2	41.3	53.5
Germany	*36.1*	17.7	22.9	26.4	29.3	*32.2*	35.5	39.9	46.1	58.0
UK	*41.8*	17.3	21.4	25.1	28.7	*32.7*	37.4	43.2	51.4	68.6

b) Male

Country	Mean	P_10	P_20	P_30	P_40	P_50	P_60	P_70	P_80	P_90
Hungary	*6.3*	2.5	2.7	3.2	3.9	*4.5*	5.2	6.3	7.9	11.1
Slovakia	*6.6*	3.1	3.7	4.1	4.6	*5.1*	5.7	6.6	7.9	10.6
Poland	*7.5*	2.8	3.7	4.5	5.2	*5.9*	6.8	8.0	9.6	12.8
Italy	*27.1*	15.6	17.6	19.1	20.8	*22.8*	25.4	28.8	33.8	42.2
France	*31.2*	16.4	18.6	20.6	22.7	*25.0*	27.9	31.8	38.0	50.7
Finland	*33.1*	20.9	23.5	25.7	27.9	*30.2*	32.8	36.1	40.5	47.8
Sweden	*33.3*	19.9	23.4	25.4	27.3	*29.3*	31.7	34.9	40.1	50.1
Austria	*35.8*	19.5	22.7	25.1	27.3	*29.9*	32.9	37.3	43.8	57.9
Germany	*38.4*	19.6	24.8	28.1	30.9	*33.8*	37.4	42.0	48.8	61.7
UK	*45.7*	19.2	23.9	27.7	31.6	*35.7*	40.3	46.4	55.1	74.3

c) Female

Country	Mean	P_10	P_20	P_30	P_40	P_50	P_60	P_70	P_80	P_90
Slovakia	*4.8*	2.5	2.9	3.2	3.5	*3.9*	4.3	4.8	5.8	7.7
Hungary	*5.3*	2.5	2.6	3.0	3.4	*3.9*	4.5	5.3	6.6	9.4
Poland	*6.3*	2.5	3.1	3.7	4.4	*5.1*	5.9	6.9	8.2	10.8
Italy	*22.3*	14.0	15.5	16.8	18.1	*19.7*	21.5	23.9	27.5	33.7
France	*25.3*	14.5	16.2	17.8	19.5	*21.6*	24.1	27.2	31.5	39.1
Austria	*26.1*	14.4	16.8	18.7	20.7	*22.6*	25.3	28.8	33.5	41.3
Sweden	*26.2*	11.5	18.4	21.2	23.1	*24.9*	26.8	29.3	33.0	40.1
Finland	*26.5*	17.8	19.8	21.3	22.8	*24.3*	26.0	28.2	31.4	37.6
Germany	*29.3*	13.8	18.8	22.0	24.6	*27.2*	30.1	33.6	38.3	45.9
UK	*32.1*	14.9	17.8	20.4	22.9	*25.8*	29.3	33.9	41.0	53.6

Note: For Hungary, Slovakia, Poland, Sweden and the UK wages were converted using the average exchange rate with the Euro during 2002. Comparisons of the level of wages across countries are preferably made in purchasing power parity terms. This has not been done here as the comparative interest is in the difference in the degree of wage inequality among these countries, which is not affected by the application of purchasing power parities.

Source: Own analysis of Eurostat's 2002 SES.

Wage inequality differs greatly. In Poland those at the bottom decile earn 48% of the median wage, while those in Finland earn nearly 70%. By contrast those at the top in Finland earn 162% of the median wage, whereas those in Hungary earn 247%. The ten countries can be

divided into three groups. On the one hand, there are Finland and Sweden where the wage at the top decile is between 2.3 and 2.7 times that at the bottom. At the other extreme, there are the UK, Hungary and Poland where the ratio lies between 4 and 4.5 times. In between, one finds Austria, France, Germany, Italy and Slovakia where the wage ratio is between 3 and 3.5. These data indicate that there are significant cross-country gender differences in pay and that wage inequality also differs by gender (inequality tends to be smaller among women). Consequently, it makes sense to present aggregate entitlements rather than those on mean wages, as is mostly done in the literature. This is also preferable to presenting comparative tables of hypothetical cases based on multiples of the average wage,[148] as the importance of these cases varies significantly. For instance, it is misleading to compare the entitlements of those on half mean wages in Finland and Poland, because very few Finns have that low a wage while those at the bottom two deciles in Poland have even less.

To estimate the financial consequences of these entitlements, these aggregate indicators will be multiplied by the projected pensioner population. The latter are taken from Eurostat's population projections; EUROPOP-2008 convergence scenario. These were also used to compute the working age population (based on the pension ages in Table 6.1). These projections indicate that despite higher pension ages, the ratio of pensioners to the working age population is expected to increase substantially (see Table 6.3). The largest rises are expected in Poland and Slovakia, while the UK (mainly on account of having legislated the highest pension age among these countries) should have the smallest rise.

Table 6.3: Ratio of pensioners to working age population (%)

	Pensioners to working age (2005)	*Pensioners to working age (2050)*	*% change in demographic dependency*
UK	30	31	5%
Hungary	42	64	53%
Sweden	27	43	58%
Austria	29	49	67%
Italy	36	60	69%
France	35	61	76%
Germany	27	50	85%
Finland	24	47	100%
Slovakia	27	71	160%
Poland	23	69	200%

Note: Pensioners defined as the population above pension age, while working age is defined as 20 to pension age (see Table 6.1). Countries ordered by size of change in dependency.
Source: Own analysis of Eurostat population projections.

[148] As is, for instance, done in OECD (2007).

Throughout, this research will be utilising Eurostat's gender-specific mortality tables for 2004 and 2050. Table 6.4 shows life expectancy in period terms[149] at state pension age for the ten countries. French men and women have the longest period in retirement, at 23 and 28 years, respectively, rising by 2050 to 28 and 33 years, respectively. By contrast, in a number of countries, which are currently equalising pension ages between genders, the number of years women spend in receipt of state pensions should decline significantly. In countries where the state pension age for men is increasing, like Germany, Hungary and the UK, men in 2050 could still be spending more years in retirement than they are currently. Table 6.4 suggests that the large increase in dependency observed for some countries, such as Poland and Finland, is attributable to the large rise anticipated in life expectancy at state pension age.

Table 6.4: Life expectancy at state pension age (on a period basis)

	Men			*Women*		
	2004 old rules	*2050 old rules*	*2050 new rules*	*2004 old rules*	*2050 old rules*	*2050 new rules*
Poland	14	20	20	24	28	28
Finland	16	21	21	21	25	25
UK	17	21	18	25	28	20
Germany	17	22	20	21	25	23
Austria	17	23	23	26	31	26
Italy	18	22	22	27	31	26
Hungary	18	25	23	28	33	26
Slovakia	18	24	22	26	30	25
Sweden	18	21	21	21	25	25
France	23	28	28	28	33	33

Note: Countries ordered by life expectancy of men at current state pension age.
Source: Own workings from Eurostat mortality tables.

Finally, before presenting the sustainability indicators, it is worthwhile to state that the economic assumptions of APEX are a 2% real discount rate, a real interest rate of 3.5%, real earnings growth of 2%, price inflation of 2.5% and a GDP growth rate of 1.6%. These assumptions are selected by the OECD on the basis of its forecasts of economic developments. Initially these assumptions will be taken as given, but in Chapter 9, they will be modified, as they have a significant impact on the outcomes for certain countries. In particular, system outcomes in countries with NDC systems, which base their notional return on contributions on either earnings growth or GDP growth, are quite sensitive to changes in these assumptions.

[149] When mortality is expected to continue improving over time, period life expectancy underestimates actual life spans. However cohort life expectancy data, which would address this issue, are not available on a harmonised European basis. In the UK there is a gap of 3 years between period and cohort life expectancy.

6.2 The social sustainability indicators

Returning to the objective function set out in Chapter 5:

Max f(PA, CS) subject to g(IB, FS)

We propose the following measures:

- *PA* (poverty alleviation) = Net pension wealth, defined in terms of the median net wage on an economy-wide basis, measured against a benchmark of an annual post-retirement income equal to 35% of the contemporary annual average net wage.[150] A ratio of 100% would imply that net pension wealth at retirement is able to generate, on average, an annual income equal to 35% of the economy-wide contemporary annual median net wage. This ratio is calculated for the cases below the median wage and then an average is taken as the aggregate indicator.
- *CS* (consumption smoothing) = Net pension wealth, defined in terms of the median net wage on an individual basis, measured against a benchmark of an annual post-retirement income equal to 60% of the annual individual median net wage.[151] A ratio of 100% would imply that net pension wealth at retirement is able to generate an annual income equal to 60% of the individual's annual median net wage. The ratio is calculated for all cases and then an average is taken as the aggregate indicator.
- *IB* (intergenerational balance) = Difference in the net pension wealth, defined in terms of the median net wage on an individual basis, of two successive generations. A ratio of 100% would imply that net pension wealth at retirement of a generation is equal to that of the previous generation. The ratio is calculated for all cases and then an average is taken as the aggregate indicator.
- *FS* (financial sustainability) = Change in the contribution rate out of the lifetime median wage required to pay aggregate gross pension wealth. A positive change implies a higher burden faced by workers to finance pension flows.

This section will estimate these social sustainability indicators for the pre-reform pension systems faced by current retirees. It will compare these with the situation which should face retirees in 2050 under the reformed systems. Note that current and future retirees differ not only in terms of the pension rules they face but also in terms of their respective life expectancy. For the rest, the economic assumptions are held constant and the wage distribution is assumed to remain unchanged over time. The current situation can be viewed as the starting

[150] As will be shown later, this is equivalent to the poverty threshold, on average, across the ten countries.
[151] The choice of the 60%, as explained later, is inspired by Holzmann & Hinz (2005).

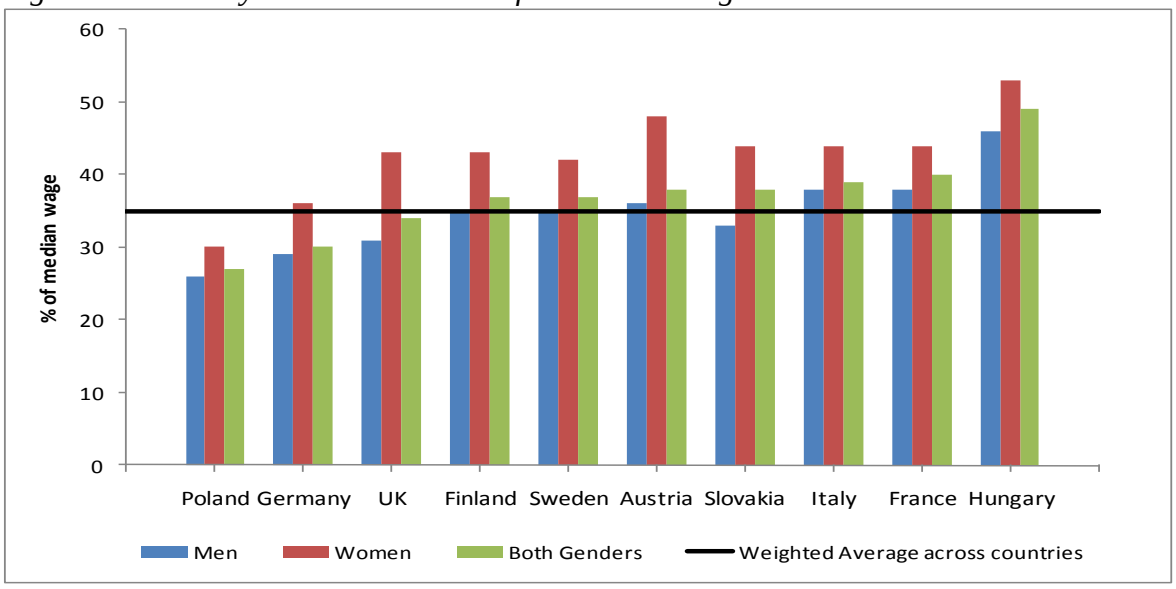
point of our analysis – and thus an attempt will be made to compare these results with the analysis made in Chapters 1 and 2 on the living standards of current pensioners and pension system typologies.

6.21 The poverty alleviation function

As argued in previous Chapters, one of the prime goals of pension systems is the alleviation of relative poverty post-retirement. Net pension wealth at the point of retirement defined in terms of the economy-wide median wage represents the relative value of total pension transfers to an individual. This can then be compared to that level of net pension wealth which would enable an annual income equal to the poverty threshold for all the years spent in retirement. If net pension wealth is higher than this 'net pension requirement', one can say that, on average, the pension system would be preventing poverty during retirement for that individual. It is important to note, however, that since pension transfers are not constant for all post-retirement years, even if net pension wealth is equal to the 'net pension requirement', there may be years when the individual has an annual income less than the poverty threshold. This point will be expanded later.

The net pension wealth indicator is defined in this case in terms of the median wage on an economy-wide basis. In order to develop a 'net pension requirement' which would equate to an annual transfer equal to the poverty threshold, we need to compare the latter to the median wage on an economy-wide basis. The poverty threshold adopted by the EU, as indicated in Chapter 1, is set at 60% of median equivalised disposable income in each country. The median wage of full-time workers is, however, significantly higher than the median equivalised disposable income (see Figure 6.1). The relation between these two variables differs by gender and by country. However, for simplicity, it was thought preferable to adopt a single value, namely the average across countries, weighted according to the relative size of total employment. On average, across the 10 countries (and also all EU25 countries) the poverty threshold for single people stands at 35% of the median wage of full-time employees of both genders. Note while here we are not imposing a common poverty line across all countries, the poverty threshold differs from the national one.

*Figure 6.1: Poverty thresholds as a % of the median wage**



** The poverty threshold for single people (set at 60% of median equivalised income in each country) is expressed as a percentage of the median wage in each country. The weight allocated to each country is according to its relative share of the total full-time employed population in all countries.*
Source: Own analysis using EU-SILC, LFS and SES.

Once this threshold is set, one can determine the 'net pension requirement' – the total transfers which would generate an income equal to 35% of the net median wage during all post-retirement years. Table 6.5, for instance, shows that men in Austria to have annual pension transfers throughout retirement equal to the assumed poverty threshold would require net pension wealth equivalent to 5.1 years of the contemporary median wage in Austria. This requirement is higher for women (7.2), because currently Austrian women retire 5 years earlier than men and, like women throughout Europe, they also have a higher life expectancy than men. The highest net pension requirements are those for women in France, Hungary and Italy. By contrast Polish men have the lowest net pension requirement, at 4.2 years.

Table 6.5: Net pension requirement for poverty alleviation (years of net median wage) in 2005

	Men	*Women*
Austria	5.1	7.2
Finland	4.9	6.1
France	6.5	7.6
Germany	5.1	6.0
Hungary	5.3	7.5
Italy	5.3	7.4
Poland	4.2	6.7
Slovakia	5.3	7.1
Sweden	5.3	6.2
UK	5.0	7.0

Source: Own analysis using Eurostat period life expectancy.

This requirement can then be compared to the net pension wealth of our hypothetical full-time individuals. Table 6.6 synthesises this by looking at the average across the 4 hypothetical individuals for each gender with a below-median wage. It indicates that at present in most countries, average net pension wealth is higher than the net pension requirement.

*Table 6.6: The pre-reform poverty alleviation function**

	Men			*Women*		
	Net Pension Wealth	*Net Pension Requirement*	*Cover (%)*	*Net Pension Wealth*	*Net Pension Requirement*	*Cover (%)*
Austria	8.2	5.1	161	8.3	7.2	115
Finland	6.5	4.9	132	7.0	6.1	116
France	7.9	6.5	121	8.5	7.6	112
Germany	5.8	5.1	115	5.5	6.0	92
Hungary	7.0	5.3	132	9.2	7.5	122
Italy	8.6	5.3	165	9.8	7.4	132
Poland	5.5	4.2	129	7.6	6.7	114
Slovakia	9.0	5.3	170	9.7	7.1	137
Sweden	6.4	5.3	120	6.2	6.2	100
UK	4.0	5.0	80	4.7	7.0	68

** These ratios are the averages for the 4 hypothetical individuals with a below-median wage.*
Source: Own analysis using APEX.

The next thing to consider is how this will change by 2050. Even in the absence of reforms, there would be a change, as longer periods in retirement due to higher longevity would increase the net pension requirement, without necessarily bringing about an equivalent increase in pension wealth (particularly as most pensions are price-indexed and so lose their relative value the longer they are drawn for). Moreover the reforms can affect both net pension wealth and net pension requirement as they can change the length of the retirement period, and net pension wealth through changes in generosity.

Projections for 2050, shown in Table 6.7, suggest that, except in the UK and Hungary, the excess of net pension wealth over the requirement for poverty alleviation will decline. This drop is more pronounced for men than for women, with the notable exceptions of Poland and Slovakia. Many reforms that cut generosity (e.g. the change in pension formula to reflect average lifetime earnings rather than final earnings) impact more on those on higher incomes. Moreover net pension requirements for women are set to grow by less than those for men because in many countries the state pension age for women is increasing faster than that for men, while life expectancy for men is set to grow faster than that for women. However note

that the adequacy of the poverty alleviation function for women will remain below that for men.

*Table 6.7: The poverty alleviation function in 2050**

	Men			*Women*		
	Net Pension Wealth	*Net Pension Requirement*	*Cover (%)*	*Net Pension Wealth*	*Net Pension Requirement*	*Cover (%)*
Austria	9.3	6.5	142	8.3	7.2	116
Finland	7.4	6.1	120	7.5	6.9	107
France	7.9	7.7	103	8.4	8.5	99
Germany	5.6	5.8	97	5.7	6.6	87
Hungary	8.9	6.6	136	9.4	7.2	131
Italy	8.2	6.3	130	8.6	7.2	118
Poland	5.3	5.9	90	5.0	7.7	65
Slovakia	8.0	6.2	128	7.2	7.0	103
Sweden	6.5	6.1	106	6.2	6.9	91
UK	5.4	5.3	101	5.7	5.7	100

** These ratios are the averages for the 4 hypothetical individuals with a below-median wage.*
Source: Own analysis using APEX.

A potentially more interesting way of looking at these developments is to translate the above into the poverty threshold which each pension system could allow. Table 6.8 shows what poverty thresholds can be achieved by the different pension systems now and in 2050. Thus, for instance, at present, looking at the average of the 4 individuals considered, the pension system is able to generate at the point of retirement net pension wealth which is equivalent to a poverty threshold of 48% and 41% for men and women respectively in the UK. Post-reform, this should rise to 61% for men and 60% for women. The size of the increase for women begs some explanation. Given that pensions are price-indexed, their relative value falls quite rapidly over time. The longer the period in retirement, the more inadequate a price-indexed pension becomes. Between 2005 and 2050, the pension age for women will rise by 8 years. This not only diminishes this negative effect, but also increases the pension entitlement of women as they are assumed to contribute for longer. Moreover in the UK, reforms have increased the generosity for those on low income, and these tend to be mainly women.

Table 6.8: The poverty threshold (% of national disposable income) that can be covered by the pre-reform and post-reform pension systems – average for the cases with below-median wages

	Men		*Women*		*Both Genders*	
	2005	*2050*	*2005*	*2050*	*2005*	*2050*
Austria	96	85	69	70	83	77
Finland	79	72	70	64	74	68
France	73	62	67	59	70	60
Germany	69	58	55	52	62	55
Hungary	79	82	73	79	76	80
Italy	99	78	79	71	89	74
Poland	77	54	68	39	73	46
Slovakia	102	77	82	62	92	69
Sweden	72	64	60	54	66	59
UK	48	61	41	60	44	60

Source: Own analysis using APEX.

To take an opposite case, in France the pension age is projected to remain stable. Despite the average net replacement rate being among the highest in Europe, the length of the time spent in retirement (the longest in Europe) reduces adequacy. In France net pension wealth covers a poverty threshold of 70%, going down to 60% by 2050, in part reflecting the effects of longer retirement, combined with price indexation. However the length of retirement is not the sole factor. Generosity is also set to drop in terms of replacement rates, as was shown in Chapter 5. Thus, for instance, in Germany despite the increase in state pension age, poverty alleviation will decline, as the net replacement rate will drop. Table 6.8 suggests that by 2050, on average, pension systems in Germany and, much more so, in Poland will stop keeping pensioners above the poverty threshold, and bring pensioners in Sweden and France dangerously close to this threshold. Women at the bottom wage deciles in Slovakia and Finland will also come close to being at risk-of-poverty. Women in Austria, Hungary and the UK, and men in the last two countries, by contrast should be more protected.

This preliminary analysis has to be qualified in three ways. First, the above discussion has looked at the average of the 4 cases with below-median wages. Secondly it looked at the post-retirement period as a whole and not at each year. Thirdly, as emphasised earlier, this is only true for the hypothetical case of a full career. While this last point will be dealt with in subsequent Chapters, the first two qualifications will be analysed in more detail here.

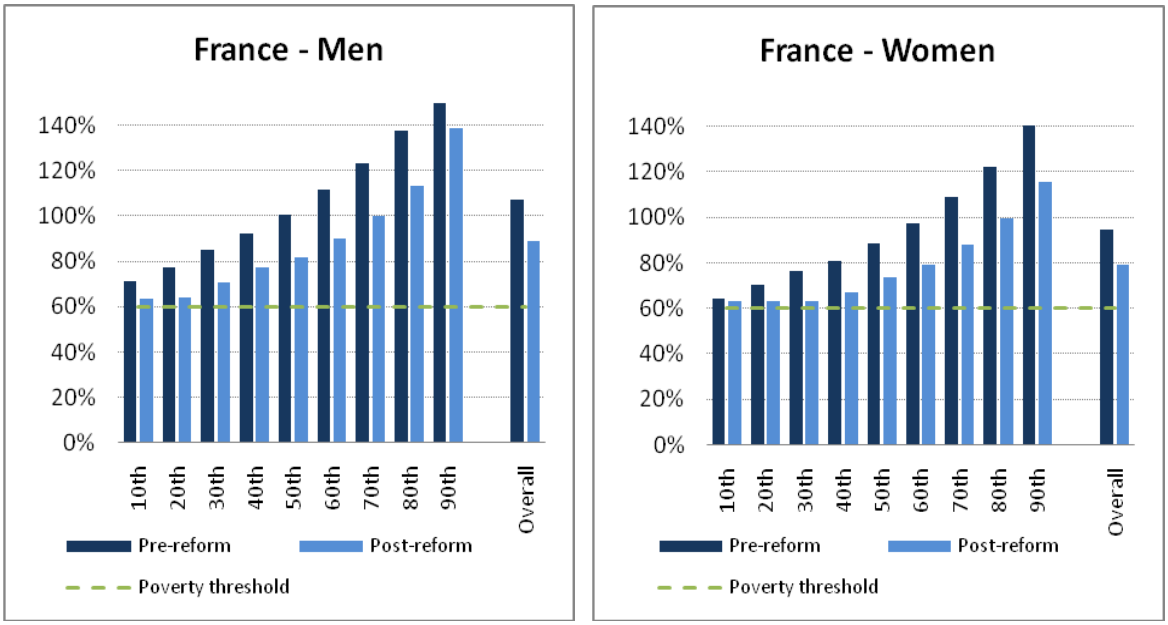
While looking at the average across the below-median wage distribution suggests that reformed pension systems guarantee the achievement of a 60% poverty threshold across 8 countries, a more detailed analysis reveals that in 6 countries, those at the bottom wage decile

will fail to meet this threshold.[152] Moreover reforms have tended to place closer to, or at, the risk-of-poverty those at the 20th wage decile (and women till the 30th wage decile) in Germany, France and Sweden.

The second qualification to Table 6.8 is that not everyone will be above the poverty line throughout retirement, as benefit indexation usually does not maintain the relative earnings value of pensions. So there can be individuals who start with an income above the threshold, but subsequently fall into relative poverty. If pensioners consume just enough to stay above the threshold and save the rest for future years, one could ignore this. However, this is unlikely and so to get a more complete picture of the poverty alleviation function, one has to consider how the relative pension level compares with the poverty threshold each year. Figure 6.2 shows, for a country in each of the three main pension system groups of Chapter 2, how the pre- and post-reform net pension level at the point of retirement compares with the poverty threshold. While there are large differences across countries at this starting point, after the reforms none of our hypothetical individuals starts retirement with a net pension level significantly below the poverty threshold.

Figure 6.2: Net pension level (as % of median equivalised income) at point of retirement compared with poverty threshold: selected countries

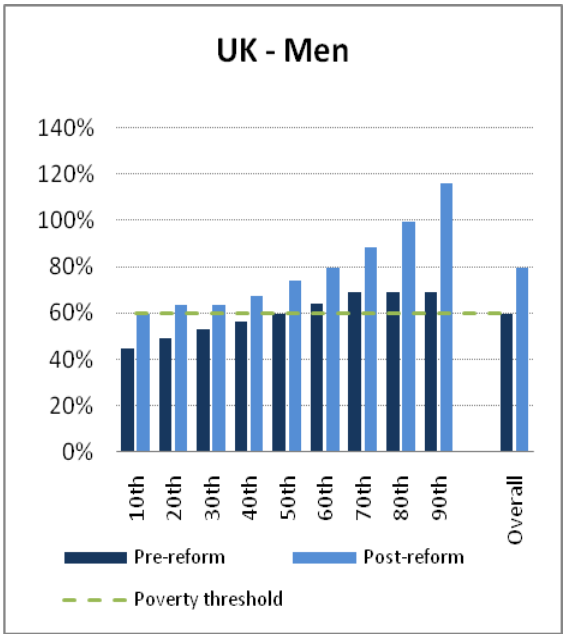
Group A: Countries with high replacement and low poverty

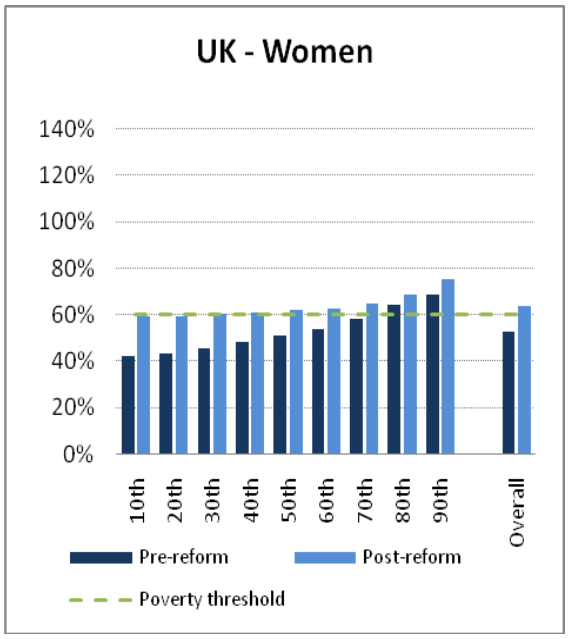


[152] A complete distributional analysis of the reforms will be presented in Chapter 8.

Figure 6.2: Net pension level (as % of median equivalised income) at point of retirement compared with poverty threshold: selected countries (cont…)

Group B: Countries with low replacement and high poverty





Group C: Countries with low replacement and low poverty

However, this changes over time, as net pension levels decline significantly. Thus for example, while at the point of retirement in 2050 the net pension level of someone at the 30th wage decile in France should be about a sixth higher than the poverty threshold, during the last

third of retirement it falls below the threshold. There are two things which are of interest here – the extent of time in retirement during which the individual's pension would be below the poverty threshold and the magnitude of the gap from this level. Table 6.9 presents projections for these two elements. The projected number of years at-risk-of-poverty for the hypothetical individuals at each wage decile have been added and expressed as a fraction of the total years spent in retirement. Similarly, the magnitude of the poverty gap for the different individuals has been added and expressed as a fraction of the poverty threshold. For instance, in the UK pre-reform our 5 male individuals up to the median wage, would have spent all their years in retirement with an income below the poverty threshold, and the average gap during these years amounted to nearly a fifth of the threshold. After the reform, they should spend just a fifth of their retirement in poverty and the average size of the gap is just 3%.

Table 6.9: Projected proportion of retirement at risk-of-poverty and depth of poverty

a) Men

	10th to 50th wage deciles							*All deciles*	
	Proportion of retirement at risk-of-poverty		*Depth of risk-of-poverty*		*Index of risk-of-poverty**			*Index of risk-of-poverty**	
	Pre-reform	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*		*Pre-reform*	*Post-reform*
Austria	0%	1%	0%	1%	0.0	0.0		0.0	0.0
Finland	0%	1%	0%	1%	0.0	0.0		0.0	0.0
France	11%	41%	7%	11%	0.8	4.5		0.5	2.5
Germany	21%	40%	12%	15%	2.4	6.0		1.4	3.4
Hungary	2%	0%	1%	0%	0.0	0.0		0.0	0.0
Italy	0%	2%	0%	1%	0.0	0.0		0.0	0.0
Poland	1%	55%	0%	22%	0.0	12.4		0.0	6.9
Slovakia	0%	8%	0%	5%	0.0	0.4		0.0	0.2
Sweden	8%	27%	5%	6%	0.4	1.5		0.2	0.8
UK	100%	39%	19%	3%	19.2	1.0		11.1	0.6

** An index value of 100 implies that all those concerned are always without any income during retirement, whereas an index value of 0 implies that no one of those concerned ever spends a year in retirement with an income below the poverty threshold.*

Table 6.9: Projected proportion of retirement at risk-of-poverty and depth of poverty (cont..)

b) Women

	10th to 50th wage deciles							*All deciles*	
	Proportion of retirement at risk-of-poverty		*Depth of risk-of-poverty*		*Index of risk-of-poverty**			*Index of risk-of-poverty**	
	Pre-reform	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*		*Pre-reform*	*Post-reform*
Austria	15%	16%	8%	7%	1.2	1.2		0.7	0.7
Finland	0%	16%	0%	4%	0.0	0.6		0.0	0.3
France	21%	47%	8%	12%	1.8	5.5		1.0	3.1
Germany	52%	79%	17%	15%	9.1	11.9		5.1	6.0
Hungary	9%	0%	4%	0%	0.4	0.0		0.2	0.0
Italy	2%	9%	3%	4%	0.1	0.4		0.0	0.2
Poland	13%	100%	8%	33%	1.0	33.4		0.6	19.5
Slovakia	7%	33%	11%	13%	0.8	4.2		0.4	2.3
Sweden	39%	67%	14%	14%	5.4	9.7		3.0	5.4
UK	100%	66%	32%	3%	32.2	2.0		22.9	0.5

** An index value of 100 implies that all those concerned are always without any income during retirement, whereas an index value of 0 implies that no one of those concerned ever spends a year in retirement with an income below the poverty threshold.*

Note: The proportion of retirement at-risk-of-poverty is estimated by summing up the total number of years during which the pension value would be below the poverty threshold for the hypothetical individuals, and then expressing as a % of the total number of years spent in retirement. The depth of risk-of-poverty is estimated by summing for those years at-risk-of-poverty for the hypothetical individuals the difference between the pension level and the poverty threshold, and then expressing it as a % of the poverty threshold for those years.

Source: Own analysis of APEX results.

The first thing to note from Table 6.9 is that women face a significantly higher proportion of retirement at-risk-of-poverty than men. In most cases this reflects the fact that women spend more time in retirement, and thus are more likely to be disadvantaged by price indexation. In fact, in countries where the state pension age gap between men and women is being phased out – Hungary and the UK, the improvement in the index of the risk-of-poverty is much more pronounced for women than for men.

The second thing to note is that despite the indicators shown in Table 6.8, in a large number of countries, individuals in the bottom half of the wage distribution will still be exposed to some years of poverty, despite their average pension transfers being higher than the poverty threshold for the post-retirement period as a whole. Thus, while Table 6.8 seemed to indicate that men at the bottom deciles in the UK were now clear of the poverty threshold, actually they may still be at-risk-of-poverty during their later retirement years.

The third thing to notice is that adequacy is not guaranteed by having high initial net pension levels. Leaving the length of retirement to rise, while having in place price indexation,

undermines adequacy significantly. Thus, for instance, in 2050 France will grant its median pensioners a net pension level which is a third higher than that in the UK. Its pensioners will also spend in retirement a period which is nearly 60% longer than UK pensioners. However the UK price-indexes only the earnings-related part of its state pension, while the whole French system is price-indexed. Hence, the number of years pensioners in France can expect to spend in poverty is higher. When looking at those at the bottom five deciles, after reform French men will spend, on average, 12 years in poverty (up from 3 under the pre-reform system) as against 7 years for UK men (down from 17); while for women the respective projections are 16 years (up from 6) in France and 13 years in the UK (down from 25).

With the exception of Poland, reforms have not increased significantly the depth of poverty.[153] In most countries, the overall risk-of-poverty appears to be increasing primarily because pension entitlements lose value significantly over the period in retirement. This indicates the importance for policymakers to consider the implications of their pension system's indexation rules, particularly for minimum pensions.

Conclusions

To summarise, the above discussion has indicated that:

1. Except in Hungary and the UK, recent pension reforms have decreased the poverty threshold which pension transfers can, on average, cover. The level of differences among countries has remained stable, with very little effective convergence.
2. While in some countries, the level of provision to those at the bottom wage decile now appears to be closer to the poverty threshold, taking the whole post-retirement period as a whole, provision remains adequate in many countries.
3. However, the reforms have increased the years during which we may expect individuals at the bottom wage deciles to be at-risk-of-poverty. The resulting depth of poverty does not appear to be substantial, except in Poland.

6.22 The consumption smoothing function

The other main task of pension systems is enabling consumption smoothing. Existing literature usually measures this through replacement rates, or comparisons of post-retirement income with pre-retirement income. In this section we are going to instead use net pension wealth, in order to capture the anticipated total post-retirement income rather than just that at the point of

[153] In the UK and Hungary reforms reduced the depth of the risk-of-poverty, particularly for women. In Germany and Austria reforms reduced the time during which pensions fall short of the poverty threshold

retirement. Moreover we are going to compare this net pension wealth, defined in terms of the individual's previous income, with a net pension requirement which implies, on average, a net replacement rate over the whole post-retirement period of 60% of the individual's pre-retirement income. Note that this differs from the previous indicator in two ways; namely using one's own pre-retirement income as a benchmark and the choice of 60% as a representative threshold. The first difference inevitably follows from the fact that here we are concerned with individuals maintaining their previous level of consumption, rather than comparisons with the average economy-wide income level. This should result in some interesting differences from the previous section. Moreover we will be looking at the entire wage distribution rather than just below-median cases.

The threshold used for consumption smoothing differs in an absolute sense across the different deciles as it is set at 60% of a decile's previous wage, whereas the poverty threshold was equal for all cases. As regards the choice of 60% as a representative threshold, this is subjective, as there are no internationally agreed thresholds in this area (as against the poverty threshold adopted by the EU). One may opt for different thresholds, but we follow the convention in Holzmann & Hinz (2005) that systems that offer replacement rates above 60% are "not affordable".

Table 6.10 shows APEX estimates of the net pension wealth anticipated for men and women at the point of retirement in 2050. These indicators are an average for the 9 different individuals (by gender) studied. For instance, men in Italy, on average, will at the point of retirement have claim to 13.1 years of average wages. By contrast if they were to receive 60% of their average wage for every post-retirement year, they would require net pension wealth equal to 10.9 years. Thus their cover ratio is of 121%. Table 6.10 indicates that most countries will be able to generate net pension wealth equivalent to an annual flow of 60% of pre-retirement individual income. The only exceptions appear to be the UK, France and Poland. The strongest levels of cover are found in Austria, Hungary and Italy.

*Table 6.10: The consumption smoothing function in 2050**

	Men			*Women*		
	Net Pension Wealth	*Net Pension Requirement*	*Cover (%)*	*Net Pension Wealth*	*Net Pension Requirement*	*Cover (%)*
Austria	14.5	11.2	130	16.7	12.3	137
Finland	12.0	10.5	114	14.0	11.9	117
France	12.4	13.2	95	15.6	14.6	102
Germany	11.2	9.9	113	14.1	11.3	119
Hungary	16.9	11.2	151	18.4	12.3	150
Italy	13.1	10.9	121	14.8	12.4	122
Poland	10.6	10.2	104	11.2	13.2	83
Slovakia	11.9	10.7	112	13.0	11.9	111
Sweden	10.8	10.5	103	12.7	11.8	107
UK	7.2	9.1	79	10.1	9.8	100

** These ratios are the averages for the 9 different hypothetical individuals.*
Source: Own analysis using APEX.

Given the lack of consensus over the required replacement rate, it is useful to transform the cover ratios in Table 6.10 to the overall post-retirement replacement rates which can be offered by the different systems. Table 6.11 indicates that except for Hungary and the UK, the replacement rate will drop substantially. The median replacement rate for men in 2005 across these ten countries was 80% (incidentally quite close to the relative income ratio observed by the income survey data reviewed in Chapter 1). By 2050 this should drop to 68%. For women, the drop is slightly more pronounced, from 82% in 2005 to 69% in 2050. Note that since here we are using individual pre-retirement income, gender comparisons need to be made with caution. While women may seem to get better replacement rates, one needs to keep in mind that their income level is substantially below that of men. Given the presence of minimum pensions and progressive elements in pension structures, the own-wage replacement rate earned by women tends to be higher than that for men in the majority of the countries under study. Interestingly this appears to be increasingly the case also in Bismarkian countries (Austria and Germany), while in countries which moved to NDC (Poland, Italy and to a lesser extent Sweden), women appear to be less advantaged.

Table 6.11: The replacement rate (% of pre-retirement wage) that can be covered by current and future pension systems – average for the 9 different levels of wages

	Men		*Women*		*Both Genders*	
	2005	*2050*	*2005*	*2050*	*2005*	*2050*
Austria	91	78	83	82	87	80
Finland	75	69	75	70	75	69
France	68	57	71	61	70	59
Germany	85	68	82	71	83	70
Hungary	85	90	83	90	84	90
Italy	92	72	82	73	87	73
Poland	87	63	86	50	87	56
Slovakia	72	67	83	67	78	67
Sweden	66	62	71	64	69	63
UK	40	48	44	60	42	54

Source: Own analysis using APEX.

Table 6.11 also suggests some interesting developments in the role of pensions across countries. The UK, though it has increased the state-only replacement rate, remains a multi-pillar country, as the replacement rate which is provided remains low. By 2050, it seems to be joined by Poland, which at present is in the high replacement rate group. France's position also appears to be changing – though here this appears to be the result of policy inaction. Keeping the pension age at 60 in spite of increased longevity lowers the generosity of the French system substantially. Turning to Germany and Slovakia, the drop in their replacement rates results in them converging towards those offered in the Scandinavian countries. Only Austria and Hungary remain clearly in the high replacement group category. Chapter 8 will look in detail at how replacement rates that can be generated by pension systems differ according to one's position in the wage distribution, and what, if any, changes the reforms might lead to. At this stage, the main thing to report is that the reforms appear to have cut significantly the progressiveness of the pension systems in Poland and Slovakia, with replacement rates for those on low incomes falling close to the levels of those on high incomes. Conversely the French, German and UK systems appear to have become more progressive.

Table 6.12 further decomposes the projected development over time of the consumption smoothing function. Concentrating on the middle part of the wage distribution, it shows that the strength of this function will decline in France, Sweden and Poland (in that order). As for the UK, while the reforms appear to have increased replacement rates, they have not fundamentally changed the nature of the scheme – which provides high replacement rates only for those on low incomes. In fact, the main gain in replacement rates is for women on lower incomes who qualify for the more generous accrual of the state second pension.

Table 6.12: Projected % of retirement with less than 60% replacement rate and size of gap

a) Men

	30th to 70th wage deciles						*All deciles*	
	Proportion of retirement with low replacement		*Magnitude of replacement gap*		*Index of replacement gap**		*Index of replacement gap**	
	Pre-reform	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*
Austria	0%	5%	0%	5%	0.0	0.3	0.0	1.4
Finland	0%	0%	0%	0%	0.0	0.0	0.0	0.0
France	23%	71%	9%	12%	2.0	8.6	2.0	9.5
Germany	0%	2%	0%	1%	0.0	0.0	0.0	0.1
Hungary	0%	0%	0%	0%	0.0	0.0	0.0	0.0
Italy	0%	0%	0%	0%	0.0	0.0	0.0	0.0
Poland	0%	40%	0%	6%	0.0	2.6	0.0	2.5
Slovakia	3%	9%	1%	2%	0.0	0.2	4.9	0.3
Sweden	4%	74%	2%	4%	0.1	3.3	2.2	2.0
UK	100%	100%	34%	23%	33.9	23.1	35.4	23.8

b) Women

	30th to 70th wage deciles						*All deciles*	
	Proportion of retirement with low replacement		*Magnitude of replacement gap*		*Index of replacement gap**		*Index of replacement gap**	
	Pre-reform	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*
Austria	0%	0%	0%	0%	0	0	0.0	0.2
Finland	0%	2%	0%	3%	0	0	0.0	0.0
France	10%	54%	4%	11%	0.4	6.1	0.5	5.6
Germany	0%	3%	0%	1%	0	0	0.0	0.0
Hungary	0%	0%	0%	0%	0	0	0.0	0.0
Italy	0%	2%	0%	4%	0	0.1	0.0	0.0
Poland	1%	100%	1%	24%	0	23.8	0.2	20.1
Slovakia	0%	5%	0%	1%	0	0.1	0.5	0.2
Sweden	6%	48%	2%	5%	0.1	2.5	0.5	2.2
UK	100%	60%	29%	12%	28.7	6.9	28.7	11.6

** An index value of 100 implies that all are always without any income during retirement, whereas a value of 0 implies that no one spends a year in retirement with an income below the 60% threshold.*
Note: The proportion of retirement with low replacement is estimated by summing up the years during which the replacement rate would be below 60%, and then expressing this as a % of the total number of years in retirement. The magnitude of replacement gap is estimated by summing for those years at risk of low replacement for the hypothetical individuals the difference between the replacement rate and the 60% threshold, and then expressing it as a % of this threshold for those years.
Source: Own analysis of APEX results.

Conclusion

To summarise the above discussion:

1. The consumption smoothing function has weakened significantly in most countries, as after reforms, pensions will replace less of pre-retirement income indicating that in some countries, individuals may require private saving to maintain pre-retirement consumption.
2. Women tend to face better own-wage replacement rates than men due to the presence of minimum income guarantees and progressive benefit formulae.
3. The weakening of consumption smoothing appears to be stronger than that of the poverty alleviation function. This suggests that in some cases, reforms have changed the relationship between replacement rates and the individual's previous position in the wage distribution. Where progressiveness improved, this was done at the expense of lower consumption smoothing for those on higher incomes. In a few cases, such as Poland and Slovakia, reforms have instead decreased progressiveness.

6.23 The intergenerational balance constraint

The first two indicators related to the goals part of the objective function set out in Chapter 5. The maximisation of these two goals is subject, however, to two constraints. The first one is intergenerational balance – namely that the resources transferred to one generation compare well with those transferred to a previous generation. As has been argued in previous Chapters, a reform that changes substantially the size of pension transfers could result in political pressures to reverse these changes. It should be emphasised that it is not just changes in pension system generosity which can change the size of transfers. Longevity also induces substantial changes, particularly in the absence of changes in the pension age. The best way to capture both the changes in system generosity and the length of retirement is through a pension wealth indicator. Moreover since what matters is the net resource transfer to each generation, an indicator that measures intergenerational balance should capture pension transfers net of taxes.

These net pension wealth indicators will be computed in relation to the individual's pre-retirement wage. The hypothesis here is that individuals will compare the size of the transfers they receive to those received by others in a similar relative situation a generation earlier, i.e. their aspiration is to have the same consumption smoothing facility as the previous generation. In the first two indicators, net pension wealth was compared to benchmarks in the form of net pension requirements. By contrast, in this case, the only benchmark will be the net

pension wealth of current generations. This may be somewhat subjective, particularly in the case of women as these at present tend to have lower state pension ages than men. Thus current pension transfers may be too high a benchmark, particularly as they are a residue of the time when most women did not accrue pension entitlements on their own right. However, it is also true that in many countries, the equalisation in state pension ages has been accompanied by reforms intended to improve the pension prospects of women (e.g. in the UK, eligibility conditions have been decreased, while many countries have sought to introduce credits for childcare).

Table 6.13 compares the net pension wealth (defined in years of contemporary average wages) of the 2005 and 2050 pensioner generations. While there are substantial differences among countries, it is interesting to note that a simple median across all countries indicates a ratio of 109% for men, 95% for women and 101% for both genders. This suggests that while the reforms may have decreased the strength of the poverty alleviation and consumption smoothing functions, the relative size of pension transfers should remain stable. Women end up slightly worse off, but the drop is surprisingly low given that state pension ages for women are set to rise at a much faster pace than those for men.

Table 6.13: A comparison of the net pension wealth of 2005 and 2050 pensioner generations*

	Men			**Women**			**Both genders**		
	Net Pension Wealth 2005	*Net Pension Wealth 2050*	*Ratio 2050 to 2005*	*Net Pension Wealth 2005*	*Net Pension Wealth 2050*	*Ratio 2050 to 2005*	*Net Pension Wealth 2005*	*Net Pension Wealth 2050*	*Ratio 2050 to 2005*
Austria	13.4	14.5	109%	17.1	16.9	98%	15.3	15.7	103%
Finland	10.6	12.0	114%	13.1	13.9	106%	11.8	13.0	110%
France	12.7	12.4	98%	15.5	14.9	96%	14.1	13.7	97%
Germany	12.2	11.2	92%	14.1	13.5	95%	13.2	12.3	94%
Hungary	12.9	16.9	131%	17.7	19.8	112%	15.3	18.4	120%
Italy	13.8	13.1	95%	17.4	15.2	87%	15.6	14.2	91%
Poland	10.0	10.6	106%	15.8	10.9	69%	12.9	10.8	83%
Slovakia	11.0	11.9	109%	16.8	13.3	79%	13.9	12.6	91%
Sweden	10.1	10.8	107%	12.5	12.5	100%	11.3	11.7	103%
UK	5.7	7.2	127%	8.8	9.8	112%	7.2	8.5	118%

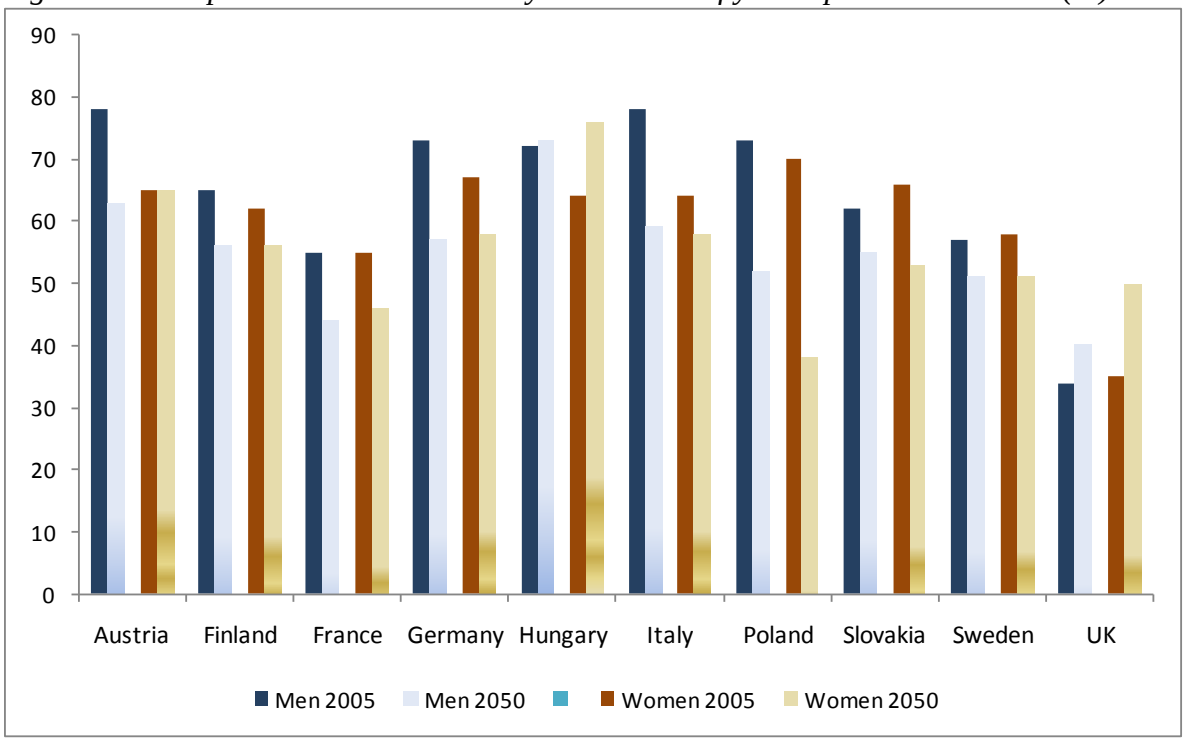
** Net pension wealth in years of contemporary average wages.*
Source: Own analysis using APEX.

The only countries where there is a significant drop, of 10% or more, in the size of pension transfers are Italy, Poland and Slovakia. In all of these countries most of the drop is concentrated among women, with the most substantial drop registered for women in Poland. By contrast, in Hungary and the UK, there is a significant improvement for both genders. In

the case of the UK, there is slight convergence towards the net pension wealth earned in other European countries, while in Hungary the effects of longevity are compounded by the further increase in generosity in the pre-2009 pension reforms.[154]

Figure 6.3 puts the increase in longevity into perspective by expressing the net pension wealth entitlement of the 2005 and 2050 generations as a percentage of the number of years they are expected to spend in retirement. Since net pension wealth is expressed in terms of years of average wages, this ratio can be seen as a form of overall replacement rate. On this measure, the largest drops will be in Poland, France, Germany, Italy and Slovakia (in that order). The declines in overall replacement projected for males in Poland, Italy, Germany and France are the most pronounced, ranging from a drop of a third in Poland to a fifth in France. Sweden, Austria and Finland register significantly lower drops (of about a tenth).[155] In the UK and Hungary, conversely, the overall replacement is set to improve, especially for women (where the improvement in generosity is also accompanied by a faster growth in the state pension age – which lowers the period during which pensions are required).

Figure 6.3: Net pension wealth divided by the number of years spent in retirement (%)



Source: Own analysis using APEX.

[154] Taking into account the reforms introduced in 2009 in Hungary, particularly the increase in pension age and the removal of the thirteenth-month pension, of course, would lead to very different conclusions.
[155] In the case of Austria, the drop is restricted to men, as policymakers appear to have compensated women for state pension equalisation by improving relative generosity.

The discussion, up to now, has focused on the average of all hypothetical cases. However, it is useful to look at how the net pension wealth of the two generations differs according to their position in the wage distribution. Figure 6.4 depicts which groups are most affected by the reforms. There are three broad categories of countries. In the first group, reforms favoured those in the bottom half of the wage distribution. In France and Germany, for instance, those at the bottom two deciles are the only group which in the future will have higher net pension wealth relative to the 2005 generation. Similarly in the UK, those in the bottom half register the highest gains. In the second group of countries, reforms advantaged those in the top half of the wage distribution. This is very evident in Poland and Slovakia, which moved away from very progressive pension structures to highly earnings-related ones. In Sweden and Hungary the reforms also favoured those at the top two deciles, but one should note that, contrarily to what is observed for Poland and Slovakia, this was not at the expense of those at the bottom deciles. Finally, in the third group of countries the reforms were distribution-neutral, with the changes for all deciles being nearly equivalent.

Figure 6.4: The intergenerational balance function – comparison of the different income groups

Countries where reforms were distribution-neutral

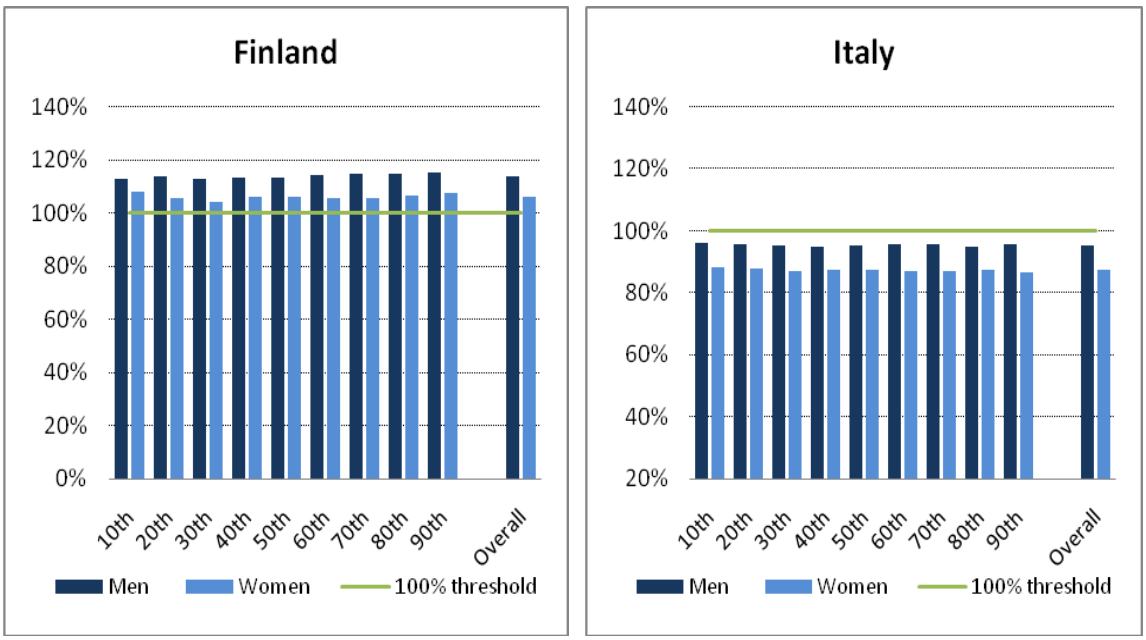


Figure 6.4: The intergenerational balance function – comparison of the different income groups..continued

Countries where reforms favoured the bottom half of the wage distribution

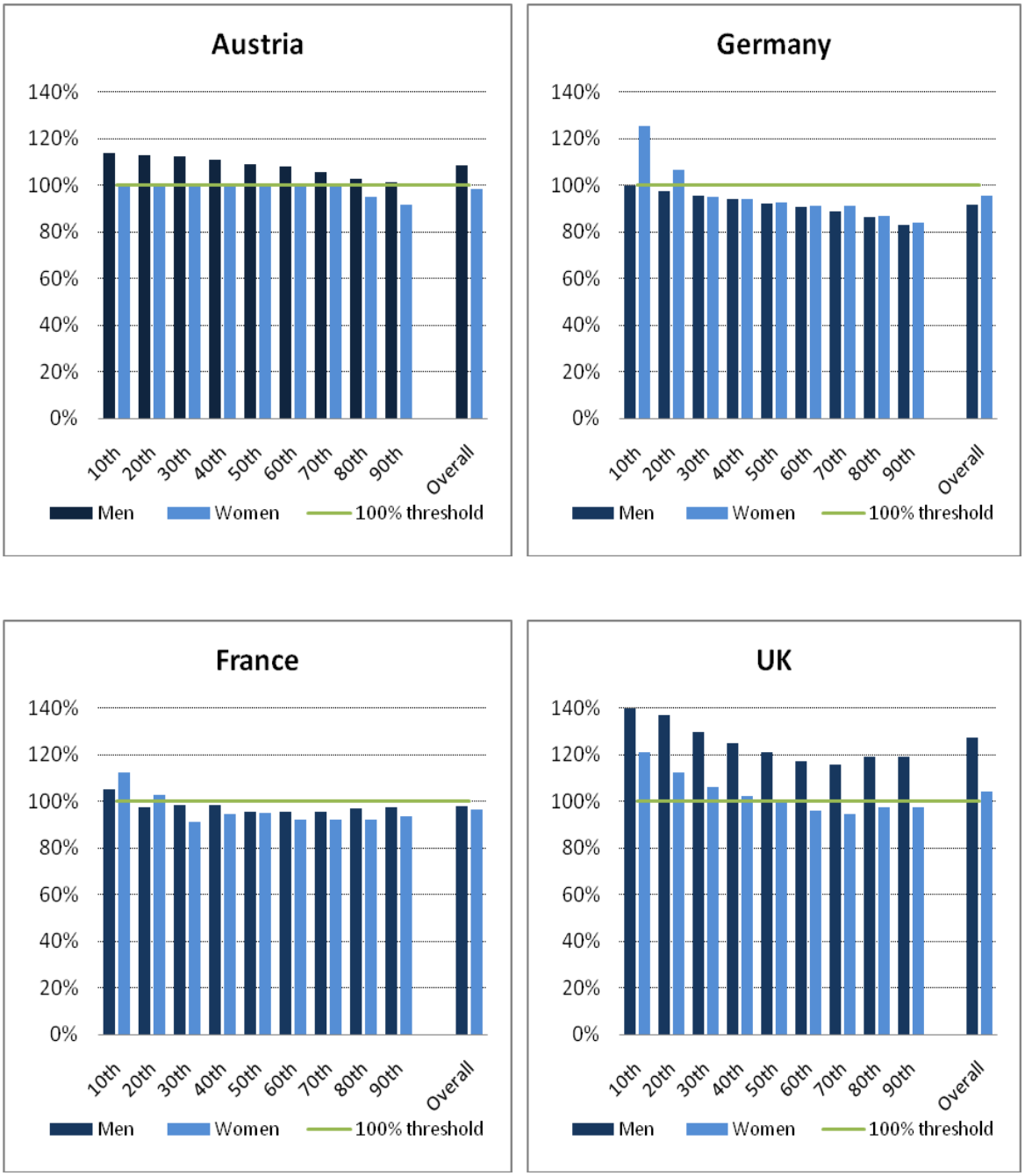


Figure 6.4: The intergenerational balance function – comparison of the different income groups…continued

Countries where reforms favoured the top half of the wage distribution

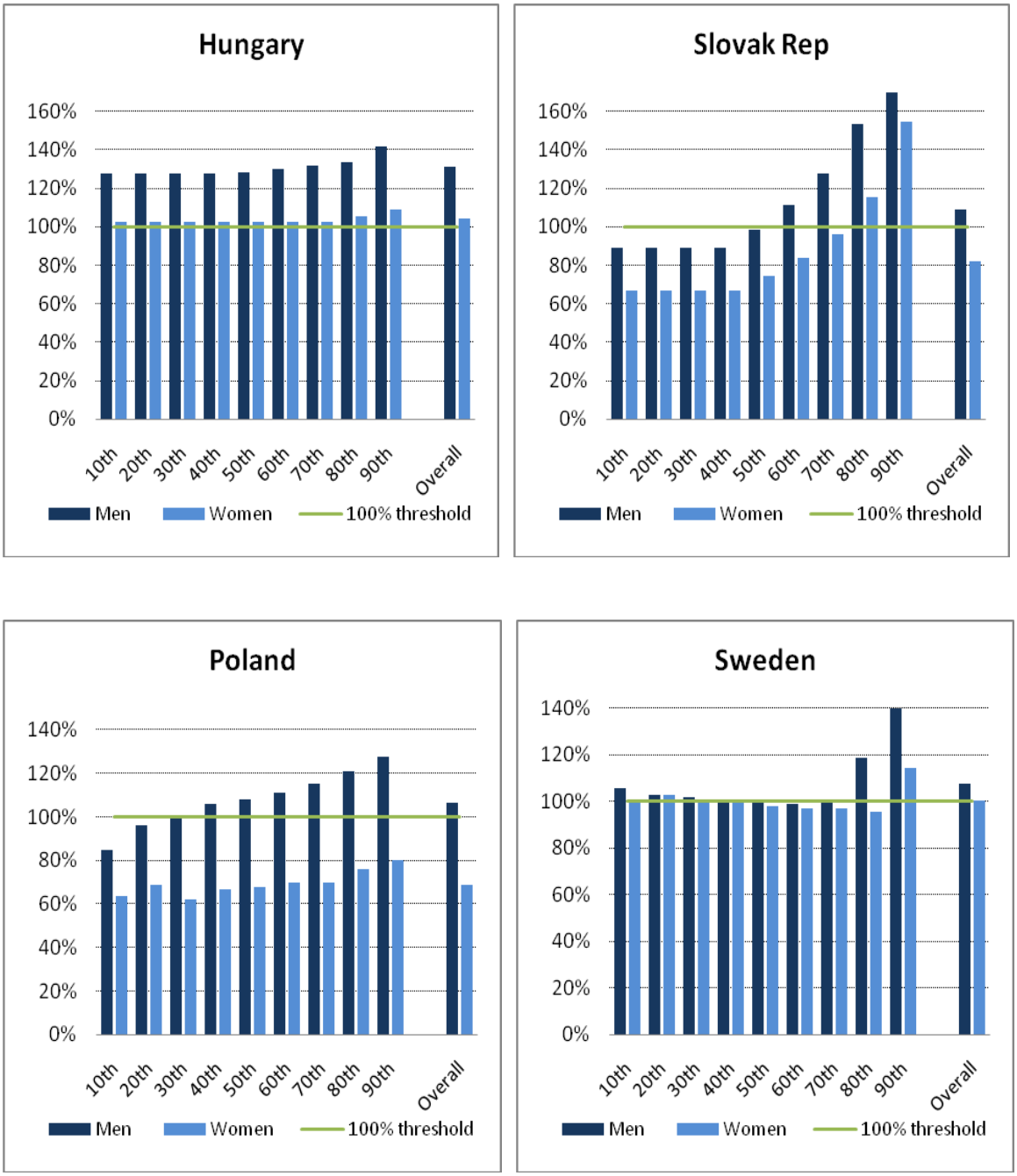


Table 6.14 presents estimates of the percentage of the 2050 pensioner generation for which net pension wealth should be smaller than for the 2005 pensioner generation and the average loss. One can observe that while there is a considerable proportion who are projected to lose out as a result of the reforms, the average loss tends to be relatively marginal when

looking at men. The loss for women is much more pronounced and spread across more countries, mainly reflecting the fact that women's state pension ages are being equalised. However, in some cases it also reflects the decline in progressiveness of pension systems, which affects women more than men, as they have lower incomes. In Germany most of the losses are registered by those at the higher deciles (while those at the bottom two deciles are projected to be better off in 2050). Similarly in Austria and the UK, the only losers are women at the top deciles on account of state pension age equalisation. Middle-income individuals are the main losers in France and Sweden, while those at the bottom deciles (and thus more women than men) are disproportionately hit in Slovakia and Poland. In Italy, by contrast, the losses are spread equally across all deciles.

Table 6.14: Projected proportion of the 2050 generation with lower net pension wealth and size, on average, of the drop

	Men			*Women*		
	% of 2050 generation with lower entitlements	*Average % decline in pension wealth*	*Index of pension wealth loss**	*% of 2050 generation with lower entitlements*	*Average % decline in pension wealth*	*Index of pension wealth loss**
Austria	0	0	0	22	7	2
Finland	0	0	0	0	0	0
France	89	3	3	78	7	6
Germany	100	8	8	78	9	7
Hungary	0	0	0	0	0	0
Italy	100	5	5	100	13	13
Poland	33	7	2	100	31	31
Slovakia	56	9	5	89	24	22
Sweden	22	1	0.2	56	3	2
UK	0	0	0	22	4	1

** The index is estimated by multiplying the % of the 2050 generation with lower pension wealth with the average % decline in pension wealth compared to the current generation. A value of 0 implies that there is no wealth loss, while a value of 100 would imply that all pensioners in 2050 had no net pension wealth.*

Note: The proportion of the 2050 pensioner generation with lower pension wealth is the number of individuals with projected entitlements smaller than those of the 2005 generation, divided by the 9 hypothetical cases. The average % decline in pension wealth is the average decline for these individuals.

Source: Own analysis of APEX results.

Conclusion

To summarise the above discussion:

1. The net pension wealth of the 2005 and 2050 pensioner generations should be quite similar. Women end up slightly worse off, but less than one would have expected given state pension age equalisation.

2. There are going to be significant drops in overall replacement, however, for men in Poland, Italy, Germany and France. The drop for men (from a median across all countries of 68% in 2005 to 56% in 2050) is significantly higher than that for women (from 64% to 54%) – as large part of the decline in the size of pension transfers to women is due to higher state pension ages, rather than lower generosity.
3. While, on average, the size of pension transfers appears to be quite stable, there are significant distributional differences across countries. In Poland and Slovakia, while the reforms hurt those in the bottom half, they also favour those in the top half of the wage distribution. In most other countries, reforms do not reduce the size of pension transfers to those at the bottom two deciles.

6.24 The financial sustainability constraint

The last indicator suggested by the objective function proposed in Chapter 5 deals with financial sustainability. The latter, as has been shown in Chapter 4, tends to be the only measure of sustainability against which pension policy tends to be assessed. In the few occasions where pension system adequacy and financial sustainability are discussed together, this has tended to involve rather different indicators, derived from separate exercises. The approach suggested in Chapter 5, by contrast, set out a financial sustainability indicator which is determined from the same basis as the pension system adequacy indicators – namely from pension wealth estimates. While this approach may not capture the complex interrelationships and feedback effects covered by macroeconomic modelling, it has the advantage of clearly setting out the trade-offs between pension system adequacy and financial sustainability indicators.

Chapter 5 sets out the approach to assess the financial sustainability of set levels of gross pension wealth. It essentially argues that a self-financing pension system needs to ensure that the average contribution rate is enough to cover the average gross pension wealth, given the ratio between the number of contributors and that of beneficiaries. Note that in this Chapter we are assuming full employment and thus all those of working age are assumed to be contributors, while all those above state pension age are assumed to have accumulated a full pension. In later Chapters this assumption will be relaxed and the number of contributors will be estimated using demographic data and projections in conjunction with estimates and forecasts of labour participation rates. Another thing to point out is that while for the other indicators we used net pension wealth – or the actual net transfers to pensioners – here we use the gross measure. This assumes that the pension system is financed just by worker

contributions rather than also by taxes on the same pensioners. Any income taxes levied on pensioners are assumed to finance non-pension outlays.

Table 6.15 provides estimates for the long-term contribution rates required so that gross pension wealth is entirely financed by worker contributions. Looking at the implied contribution rates for the current generation of pensioners, there is quite some variation among the ten countries, ranging from 6% in the UK to 22% in Hungary. The average contribution rate (with each country weighted in accordance to population size) is 11%.

Table 6.15: Long-term contribution rates (% of total lifetime wages)

	Pre-reform 2005	*Post-reform 2050*
Austria	14	23
Finland	8	18
France	15	24
Germany	8	14
Hungary	22	31
Italy	17	25
Poland	8	21
Slovakia	11	25
Sweden	10	17
UK	6	7

** This gives the proportion of total lifetime wages needed to finance the net pension wealth of different pensioner generations given system dependency ratios. Note that here we are assuming that all those of working age participate in full-time labour market activity.*
Source: Own analysis of APEX results and Eurostat population projections.

If we were to allocate countries into categories of high, intermediate and low contribution rates in line with the approach taken in Chapter 2,[156] we could check how much our hypothetical simulations compare with actual spending patterns. Table 6.16 suggests that there is quite a good degree of overlap between these two classifications, with 6 countries falling in the same categories. The only major difference lies in Germany and Poland being classified as having a low contribution rate, when they are among the high spenders. However this is mainly because the previous classification had dealt with all EU countries, while the ten countries on which we are focusing are more biased towards the high-spending category. In simpler terms, while Germany and Poland appear to be high spenders when looking at all EU countries, they are less so when one looks at these ten countries. Moreover one needs to keep in mind that up to now we have restricted analysis to full careers, a major assumption,

[156] In chapter 2, countries who spend between 0.5% of GDP less or more than the EU average on state pensions were deemed as average spenders, while those spending more were high spenders and vice versa for low spenders.

particularly for some countries (like Hungary and Poland) where labour market participation is relatively low.

Table 6.16: Categorisation of countries in terms of current pension spending and long-term contribution rates

	Pension spending 2005	*Contribution rate 2005*
Austria	High	High
Finland	*Average*	*Low*
France	High	High
Germany	*High*	*Low*
Hungary	*Average*	*High*
Italy	High	High
Poland	*High*	*Low*
Slovakia	Low	Low
Sweden	Average	Average
UK	Low	Low

** Countries where the classification differs are in italics.*
Source: Own analysis.

That said, Table 6.16 suggests that our simple financial modelling gives a picture which is quite similar to actual spending. Thus it is quite discomforting to note that Table 6.15 implies that contribution rates need to rise dramatically in many countries. In fact, the average contribution rate across all ten countries is projected to be 18% in 2050, or more than half as much again as the current level. The biggest increases are forecast for Poland and Slovakia, which, not surprisingly, Table 6.3 indicated are the countries where dependency is set to deteriorate the most between 2005 and 2050. Though Hungary, France, Austria and Italy are projected, under this method, to register relatively milder increases, by 2050 they would have quite high contribution rates. By contrast, the UK faces only a small increase in financing requirements, while contribution rates in Germany and Sweden are projected to remain below-average.

EPC (2009) includes projections of state pension spending in 2050 based on the same demographic projections used in our financial sustainability indicators. Thus we can compare our 2050 projections with those in this study, using the same categorisation as in Table 6.16. This suggests that the degree of overlap between the two categorisations remains similar when looking at 2050. The two approaches give very different results with respect to Slovakia and Poland and slightly different results for Germany and Finland.

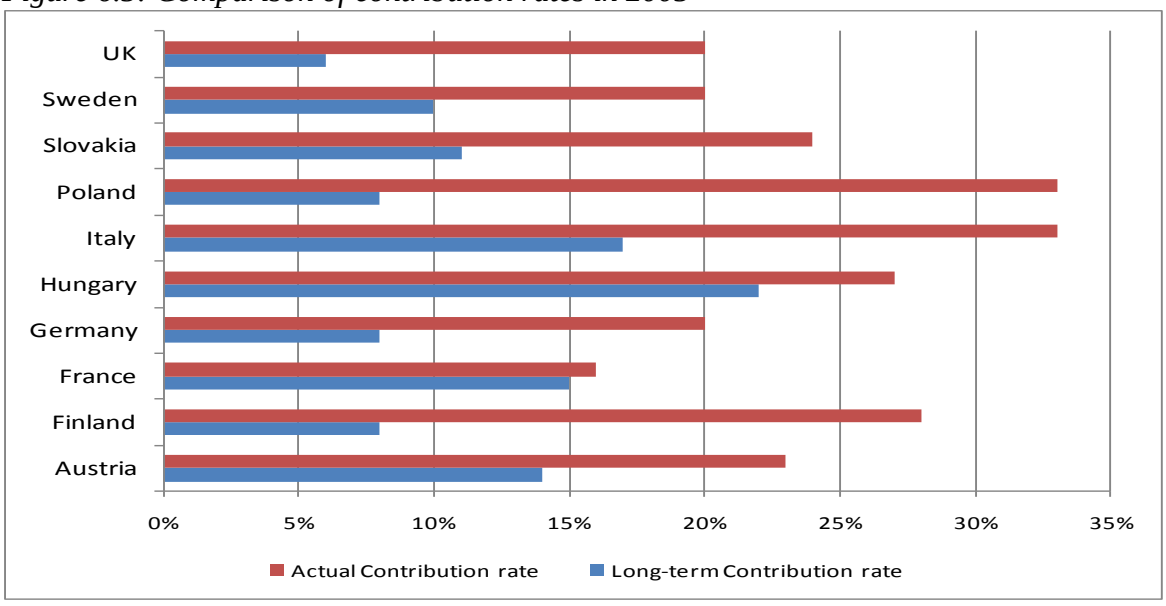
Table 6.17: Categorisation of countries in terms of future pension spending and long-term contribution rates

	Pension spending[1] *2050*	*Contribution rate 2050*
Austria	High	High
Finland	*High*	*Average*
France	High	High
Germany	*Average*	*Low*
Hungary	High	High
Italy	High	High
Poland	*Low*	*High*
Slovakia	*Low*	*High*
Sweden	Low	Low
UK	Low	Low

1. Classification of future pension spending made according to projections made in EPC (2009) using the same approach as in Table 6.16.
** Countries where the classification differs are in italics.*
Source: Own analysis.

Having discussed the trend in the long-term contribution rates, it is useful to relate them to actual contribution rates. Figure 6.5 indicates that the estimated long-term contribution rates for 2005 are significantly below current national insurance contribution rates (derived from EPC (2007)). However, one should note that national insurance contribution rates, in general, are not used to finance just state pensions. In most countries they also finance disability, sickness and survivor benefits, social assistance and, in some cases, health. Moreover at present most countries have surpluses in their national insurance funds, and in fact, in recent years many countries have set up reserve funds to finance future shortfalls.

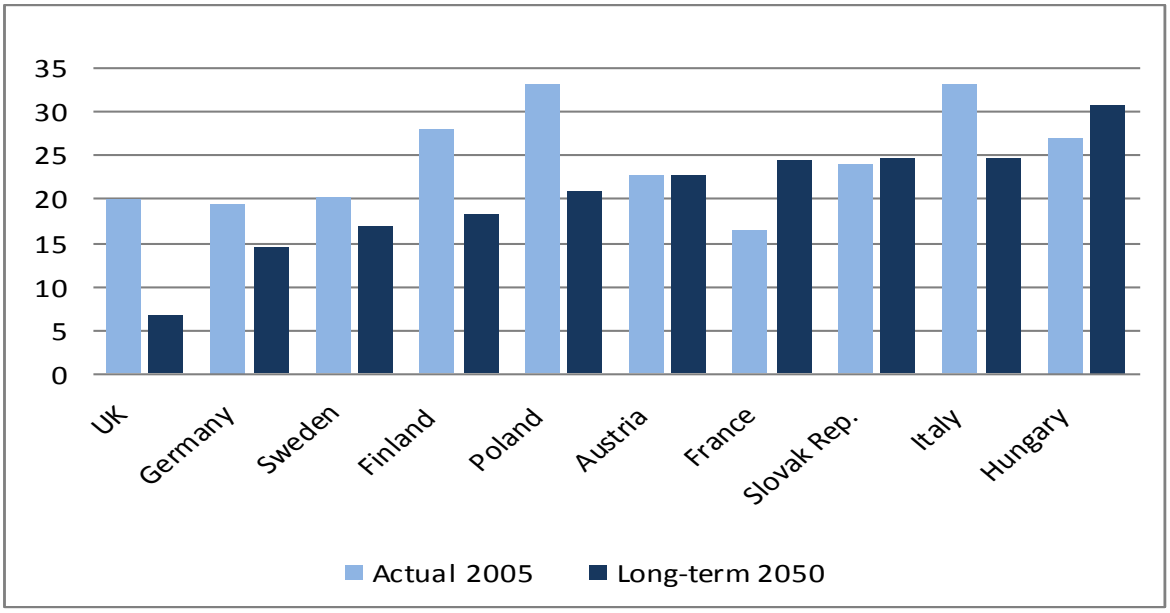
Figure 6.5: Comparison of contribution rates in 2005



Source: Actual contribution rates from EPC (2007).

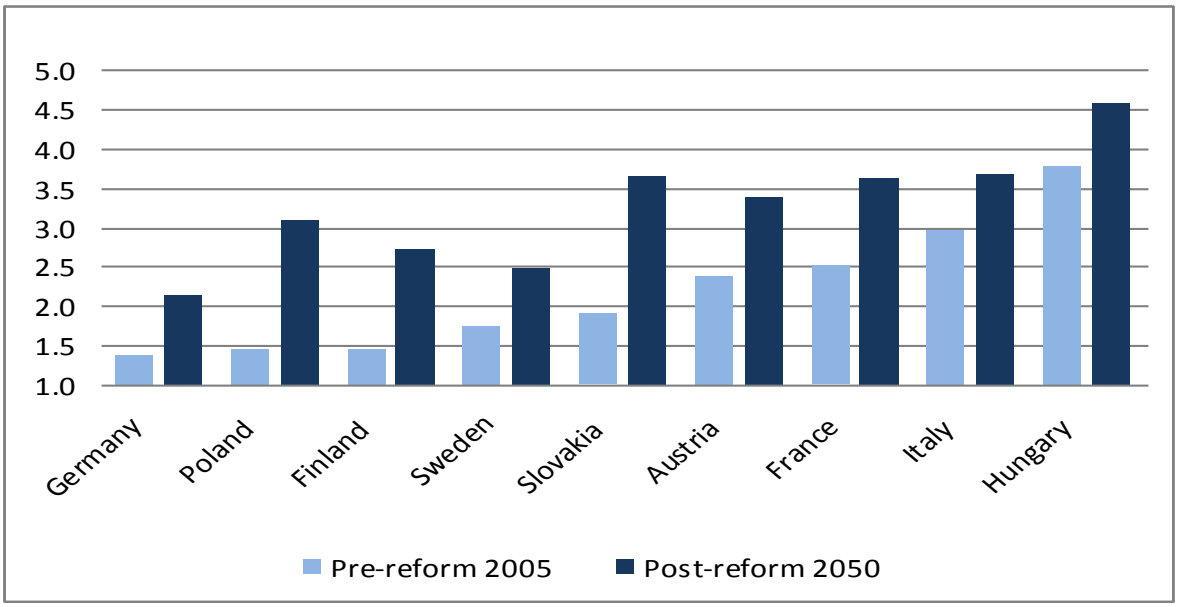
Figure 6.6 indicates that in most countries, except for France, Austria and Hungary, the implied long-term contribution rate in 2050 will still be below the existing national insurance contribution rates. It should be stressed that having long-term contribution rates exceeding current actual national insurance contribution rates is not the only evidence of financial stress. Since these contribution rates may be actually financing other items of expenditure, large increases in long-term contribution rates may not be easy to accommodate. Slovakia, Poland, Italy and Finland appear to face significant issues in this respect, as they face quite large increases in their long-term contribution rates. Sweden, the UK and Germany appear to be in less precarious conditions.

Figure 6.6: Comparison with contribution rates in 2050



Another source of financial stress comes from international competition. Countries with low contribution rates may attract labour and capital and gain an economic advantage over those where contribution rates are higher. In our case, the country with the lowest contribution rates is the UK. In 2005, the country with the closest long-term contribution ratio to the UK was Germany and the one farthest away was Hungary, where the contribution rate was nearly 4 times higher. As can be seen in Figure 6.7, by 2050, the gap between the UK and most countries will continue to grow. Austria, Finland, Poland and Slovakia appear to experience the highest relative increases. Sweden and Germany have a much less pronounced relative worsening.

Figure 6.7: Contribution rates expressed as a ratio to those in the UK



Conclusion

To sum up our discussion:

1. Despite reforms, contribution rates needed to finance pensions are set to increase substantially, especially in Poland and Slovakia. The highest rates currently are in Hungary and Italy and will remain so in 2050. The UK faces the lowest implied rise.
2. At present contribution rates are above the long-term contribution rates. This suggests that for some countries there is still some leeway before contribution rates need to increase. France and Hungary seem to be the less well-placed countries in this respect, while the UK and Germany appear to have room to manoeuvre.
3. The UK has the lowest implied long-term contribution rate and will remain by far under less financial stress than other countries. Relatively speaking, Finland, Poland and Slovakia are most likely to face financial stress on a competitive basis.

6.3 Overall assessment of the social sustainability of pension system reforms

Having dealt with the four sustainability indicators separately we can now present an overall assessment. At this stage it is important to emphasise two things. First, this analysis has focused on the full-career hypothesis and this may not be representative for some countries. This assumption will be relaxed in Chapter 8. Second, the benchmarks for future generations are the conditions enjoyed by current pensioners. Another approach, adopted in Chapter 7, is to compare outcomes for future generations under reformed and unreformed systems.

Figures 6.8 and 6.9 present graphically the changes in the sustainability indicators. Figure 6.8 looks at how the achievement of system goals will change, by plotting the replacement rate and the poverty threshold achievable, on average, by the pre- and post-reform systems in 2005 and 2050. Figure 6.9 looks at the pressure on system constraints, by plotting the net pension wealth of the 2005 and 2050 pensioner generations and the contribution rates which the respective working age generations have to pay to finance these transfers.

Figure 6.8 suggests a good degree of convergence, with only Hungary moving away.[157] The direction of the arrows shows whether systems are projected to achieve higher system goals. A right-pointing arrow indicates that pension transfers, on average, will cover a higher poverty threshold, while an upward-sloping arrow indicates that the system will generate higher replacement rates. Only the UK and Hungary have upward- and right-sloping arrows. Other countries have downward- and left-sloping arrows. The length of the arrow indicates the scale of the change in these functions. The largest decline is in Poland and the smallest in Sweden. A flatter arrow indicates that the decline in the functions is strongest for poverty alleviation. Thus the decline in Poland and Slovakia is stronger in the poverty alleviation function compared to other countries, such as Germany and Sweden. Contrarily, the improvement in the UK is more focused on poverty alleviation than that in Hungary.

Figure 6.9 indicates a more varied evolution. In all countries the arrows are upward sloping, reflecting the projected increase in contribution rates. Even though Sweden, Austria and France should maintain net pension wealth unchanged, they still need to increase contributions, on account of the larger relative size of the 2050 pensioner cohort. Countries are evenly divided between those with right- and left-sloping arrows. The countries with left-sloping arrows are projected to reduce net pension wealth for the 2050 pensioner generation, and vice versa. The length of the arrows represents the strength of the pressures on constraints, with the UK, Germany and Sweden facing the lowest pressures and at the other extreme, Hungary and Poland. The slope of the arrows is more difficult to interpret, mainly because both declining and increasing net pension wealth present pressures for policymakers. However, politically the more difficult pressure is to have to present future pensioners with lower net pension wealth despite improvements in longevity. Thus Slovakia and Poland face a tougher challenge than Hungary despite having similar arrow lengths.

[157] Hungary would also be converging if the 2009 reforms are accounted for.

Figure 6.8: Evolution of achievement of system goals

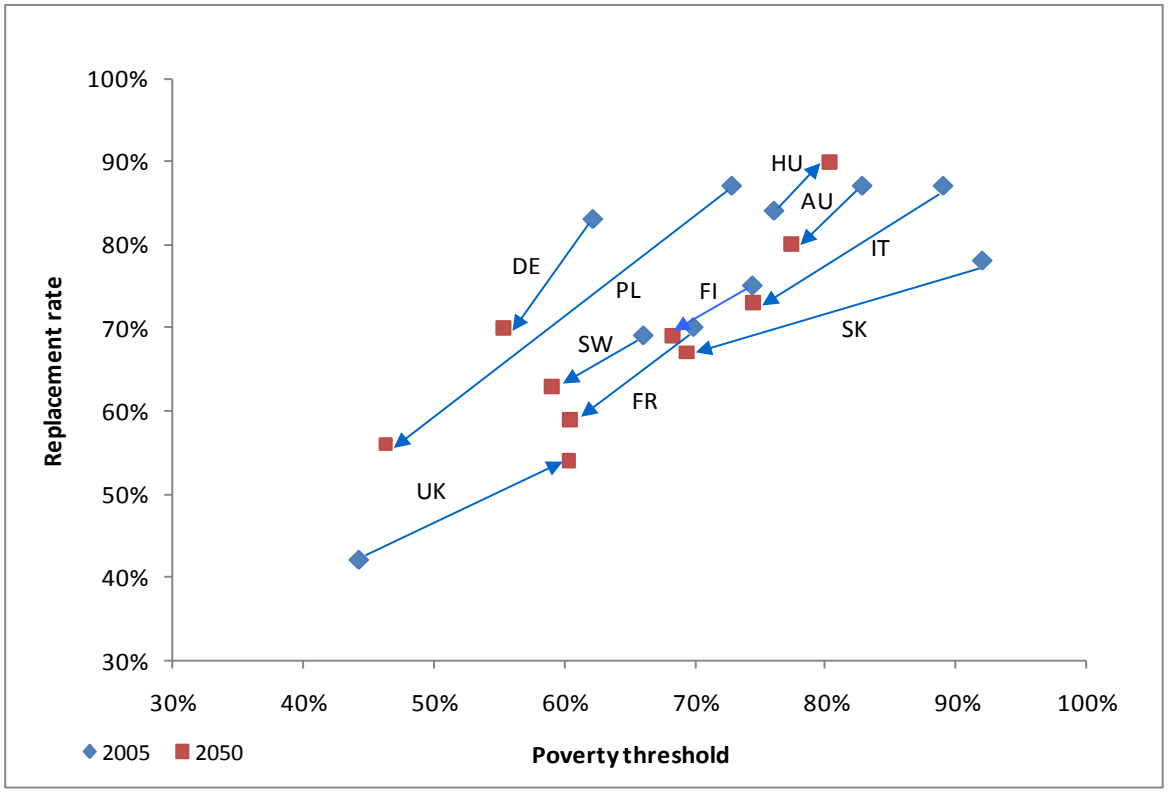


Figure 6.9: Evolution of pressure on system constraints

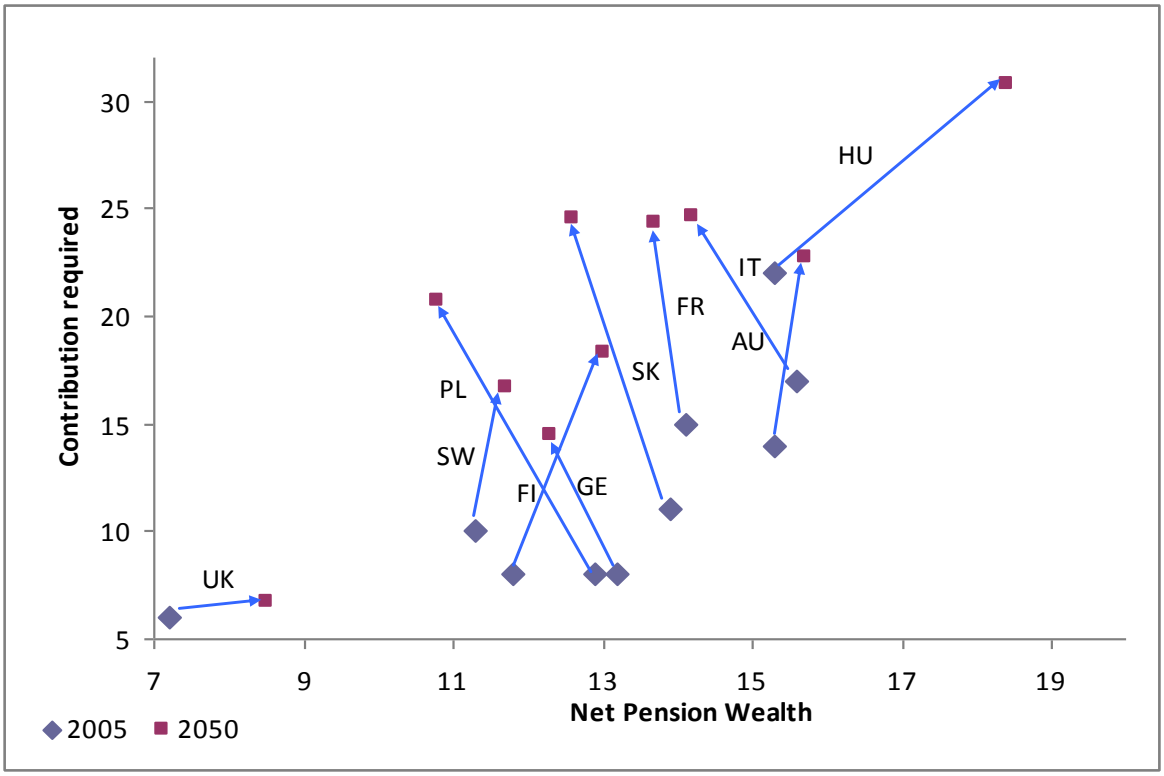


Table 6.18 presents a synthesis of the discussion in Section 6.2. The overall trend in the four indicators is summarised together with some details on the impact on women, different wage categories and considerations about the increases in contribution rates. For example, for Finland it shows that pension transfers will lose 8% of their current value relative to the poverty threshold, and a similar amount relative to pre-retirement wages, that Finns in 2050 will have 10% more net pension wealth, while the contribution rate will have to rise by 116%. The main conclusion that the Table suggests is that while reforms have reduced the strength of the poverty alleviation and consumption smoothing functions, these remain quite adequate on an overall basis in most countries. Moreover the reforms will not, in general, reduce the relative size of pension transfers to future generations, as longevity increases will offset the drops in generosity. The contribution rates needed to finance these transfers are substantially higher than at present, and for some countries this may create fiscal problems.

Table 6.18: Overall assessment of all sustainability indicators (change 2050 over 2005)

	Poverty alleviation[1]	*Consumption smoothing*[2]	*Intergenerational balance*[3]	*Financial sustainability*[4]
Austria	-7% overall, but still high	-8% overall, but still high	+3% overall	64% increase, little leeway
France	-14% overall, long retirement means some years in poverty	-16% overall, issues with replacement for medium to high earners	-3% overall, but long retirement means low replacement overall	67% increase, little leeway
Finland	-8% overall, but still high	-8% overall, but still high	+10% overall	116% increase, possible increase in relative labour costs
Germany	-11% overall, issues for low earners	-16% overall, but still high	+3% overall	81% increase
Hungary	+5% overall, system skewed towards high earners	+7% overall, replacement rates appear too high	+20% overall, system unbalanced towards future	40% increase, but contribution rate already high
Italy	-16% overall, but still high	-16% overall, but still high	-9% overall, drops spread across all income levels	43% increase, contribution rate already high
Poland	-36% overall, issues for women and for those on low incomes	-36% overall, issues for women and for those on low incomes	-20% overall, drops for women and those on low incomes	147% increase, possible increase in relative labour costs

Table 6.18: Overall assessment of all sustainability indicators (change 2050 over 2005)..cont…

	Poverty alleviation[1]	*Consumption smoothing*[2]	*Intergenerational balance*[3]	*Financial sustainability*[4]
Slovakia	-25% overall, still high but issues for women	-14% overall	-9% overall, issues for women and skewed towards high earners	121% increase, little leeway
Sweden	-11% overall, issues for women but poverty depth relatively low	-9% overall, possible issues with level of replacement for middle incomes	+3% overall	65% increase
UK	+37% overall, still some years in poverty	+29% overall, still low replacement for middle to high earners	+18% overall	15%, relatively more leeway

Notes:

1. *The percentage change given for poverty alleviation is the percentage change in the ratio, for the average of the hypothetical cases with below-median wages, between net pension wealth defined in terms of the economy-wide average wage and the pension requirement of having net pension wealth equal to the poverty threshold throughout all retirement.*
2. *The percentage change given for consumption smoothing is the percentage change in the ratio, for the average of the 9 hypothetical cases, between net pension wealth defined in terms of the individual's own wage and the pension requirement of having net pension wealth equal to 60% of one's own previous wage throughout all retirement.*
3. *The percentage change for intergenerational balance is the percentage change in the net pension wealth, for the average of the 9 hypothetical cases, for the pensioner generation retiring in 2050 as against those retiring in 2005.*
4. *The percentage change for financial sustainability is the percentage change in the long-term contribution rate required to finance net pension wealth of the different pensioner generations.*

Table 6.18 suggests that in most cases, countries have not reformed away from their current typology categories. For instance, countries with high replacement rates and high poverty alleviation (e.g. Germany and Austria) have maintained this but reduced the future cost of their systems. Similarly the UK has tried to maintain a low-cost pension system while improving poverty alleviation. Sweden, even though it adopted a systemic reform, maintained most of its emphasis on poverty alleviation (as against consumption smoothing) and kept its low-cost characteristics (but given better incentives to high earners). Conversely there has been a clear break in Poland and Slovakia with moves away from very redistributive systems, which may pose significant problems for women and for those on low incomes.

The indicators imply that there remains significant work to be done to ensure that European pension systems will remain financially sustainable in the face of the ageing

transition. Countries like Italy and Hungary face serious issues, as they already have very high cost systems. While Italy has tried to reduce generosity, Hungary improved it but limited the financial consequences by increasing the state pension age.[158] The UK has adopted a similar strategy, but more successfully, as it has focused improvements on low income earners. In Hungary, by contrast, those at the top get the best outcomes from reforms. Moreover there may be an imbalance in favour of future generations. The opposite occurs in Italy where future generations will see a significant decline in the size of pension transfers, but the system remains under financial stress due to the already high cost structure. This suggests that more needs to be done, possibly by bringing forward the reforms to affect pensioners before 2050.

In France and Finland, the main issues seem to be related to the fact that pension ages are left unchanged in the face of increasing longevity. This raises financial sustainability issues for both countries. Moreover in France the lengthening of the retirement period reduces substantially the effectiveness of the poverty alleviation function (as many pensioners will face an increase in the number of years spent at-risk-of-poverty) and of the state system as the main provider of consumption smoothing for medium- to high-income earners. Similarly the unchanged state pension age for women in Poland reduces the ability of the pension system to achieve its goals. Chapter 9 will show how longer working lives, particularly in countries with the flexible retirement ages implied by NDC schemes, could remedy these shortcomings.

6.4 Conclusion

This Chapter presented preliminary estimates for ten countries of the four sustainability indicators described in Chapter 5. Moreover, it sought to supplement these indicators with other indicators which looked at the impact of reforms on women and on those on different levels of income. The overall assessment showed that while reforms have reduced the poverty alleviation and consumption smoothing functions in nearly all ten countries, these remain high in many countries. Reforms appear to have mostly followed existing system goals, but with an eye to reduce future cost. However there have been some reforms, mostly in Eastern Europe, which may have raised adequacy issues for women and those on lower incomes. Furthermore with only some exceptions, the reforms still appear to leave pension systems relatively unprepared for the financial impact of the ageing transition. This may potentially reflect the fact that reformers have not grasped the full implications of longevity increases, possibly as the indicators which they used do not capture this element.

[158] Recent reforms have also reduced generosity.

The main methodological contribution of this analysis, in fact, lies in three innovations. Firstly, it uses pension wealth – a measure of overall generosity of transfers throughout retirement - rather than measures of generosity at the point of retirement. This captures the impact of two elements (longevity and indexation), which tend to be ignored despite their important consequences for the achievement of system goals and pressure on constraints. The second innovation is the explicit use of benchmarks against which to assess pension entitlements. Most frequently policymakers have not sought to look at benchmarks in this area, preferring to retain a good level of discretion on what constitutes 'adequate' outcomes. While the benchmarks used here can be seen as arbitrary, the framework is flexible enough to allow the testing of various outcomes. The final innovation is the attempt to measure all elements using the same indicators instead of using different models. This increases transparency and also clearly illustrates the trade-offs between system goals and constraints.

The ability of this framework to incorporate distributional and gender analysis is amongst the main empirical contributions of this work. While most of the focus in this Chapter has been on aggregate indicators, our framework allows the analysis of various sub-questions and can be used to generate a lot of in-depth analysis of the consequences of reforms. The framework clearly lends itself to being used across different pension regimes and enables a comparison of reforms which are very different in nature. It can also be used to see how systems are changing, and to what extent there is convergence in system goals and pressure on constraints. This multi-faceted framework is not however to be conceived as some form of benchmarking exercise. Rather its main aim is to capture as much as possible the full implications of reforms in order to arrive at some understanding of the potential pressures policymakers could face in the future. This aim is justified in view of the broader concept of sustainability, discussed in previous Chapters, and implies that the framework should be used to map the tactical and strategic decisions which policymakers need to take to achieve long-term stability in this field of social policy.

However it is important to emphasise that up to now the analysis has focused solely on the full-career hypothesis. As was argued in previous Chapters, this is not very representative for the current and future situations in the countries being studied. Moreover the assessment of the reforms has used the current situation as the benchmark, when it would be also appropriate to compare the anticipated effects of the reform with what would have happened had systems remained unreformed. The coming Chapters will seek to address these important issues, in order to gain a fuller understanding of the sustainability of pension reforms.

Annex 6.1: Comparing the SES data with other wage inequality data

This Chapter utilises data from Eurostat's SES covering full-time workers in NACE sectors C to K – which exclude public administration, farming, fishing, social work, health and education. This exclusion – necessitated by lack of an adequate data series with harmonised definitions and data collection methodologies for all countries – might reduce the accuracy of our results. Hence, an effort was made to test the extent to which these data differ from wage data covering the entire economy. This comparison, inevitably, had to rely on national data sources – which reduce cross-national comparability. Atkinson (2008) includes data on wage distribution for several of the countries studied in this Chapter. Table 6.A compares the degree of wage inequality in Atkinson (2008) with that implied by the data used in this Chapter. In both cases the data is for both genders taken together.

Table 6.A: How the wage earned by P10 and P90 compare with the median wage in selected countries (% of median wage)

	P10		*P90*	
	Atkinson (2008)	*Data used here*	*Atkinson (2008)*	*Data used here*
Finland	70	69	171	162
France	67	65	200	197
Germany	59	53	180	180
Hungary	51	59	244	248
Italy	60	69	156	182
Poland	51	48	206	216
Sweden	78	63	157	169
UK	55	53	198	210

Source: Atkinson (2008), SES (2002).

As can be seen from this Table, the degree of wage inequality implied by the two sets of data is similar, with some exceptions (e.g. the higher ratio shown by national data for P10 in Sweden and the lower ratio shown by national data for P90 in Italy).

7. Was pre-1990s pension policy in Europe sustainable?

Chapter 6 presented the first application of the proposed social sustainability assessment of pension reforms. It compared the performance pre- and post-reform of pension systems, looking at how effectively they will continue to achieve pension system goals and to what extent they operate within system constraints. The overall assessment was that while reforms reduced poverty alleviation and consumption smoothing in nearly all countries, these remain, on average, substantial in most countries – though in some there has been a reduction in progressiveness which puts at greater risk women and those on lower incomes. However, the Chapter also suggested that reforms still appear to leave some pension systems at considerable financial risk, especially where state pension ages fail to keep up with improved longevity.

These conclusions were based on a comparison of the sustainability indicators for the current situation and the future post-reform situation. This choice of benchmarks, while indicative of how the effectiveness of pension systems might change, may, however, belittle the achievements of the reforms. The pre-reform and post-reform scenarios, in fact, differ in one important dimension – time. Between 2005 and 2050, not only is longevity expected to improve significantly, but also pension systems will face the retirement of the Baby Boom generation – which will bring about an abrupt change in the size of the pensioner population across Europe. While the latter phenomenon is a one-off shock to pension systems, the continued improvement in longevity presents a more dynamic challenge. Moreover, as has been argued in Chapter 6, longevity should not be seen as just affecting financial sustainability. It impacts on the effectiveness of pension systems in achieving poverty alleviation and consumption smoothing – since benefit indexation tends, in most countries, to reduce the value of pensions relative to earnings over time. Longevity also has significant implications for intergenerational balance.

In this light, this Chapter will present the social sustainability indicators for the pre-reform systems in 2050. These will be compared to the current situation, so to assess how the indicators would have changed had no reforms taken place, and with the 2050 post-reform indicators, so as to give an indication of whether the reforms imply better outcomes.

7.1 The social sustainability of the pre-reform pension systems over time

This section assesses how developments in longevity and the size of the pensioner population between 2005 and 2050 would have affected the social sustainability of the pre-reform systems – a sort of ‘what-if’ scenario. As in Chapter 6, this will be done by looking at

individuals of both genders and at different levels of income working full careers till state pension age. Once again, it must be stressed that this approach suffers from the limitation that in reality full careers are not the typical case across the countries being studied, and there exist significant differences in labour participation.[159] However, it presents a good starting point when assessing the implications of pension systems and is commonly used in international comparative studies.

The benchmarks used to assess the poverty alleviation and consumption smoothing goals will be the same as in Chapter 6 – i.e. 35% of the economy-wide average wage for poverty alleviation and 60% of the individual's pre-retirement average wage for consumption smoothing. The only difference with Chapter 6 in this regard will be that net pension requirements in some countries will be larger as state pension ages will remain at their current position. This is particularly relevant for women, as their state pension age would remain below that for men.

Another important difference from Chapter 6 will be the assumption on the disposable income of the working age generation in 2050. As will be shown in the next section, the pre-reform pension systems would have cost significantly more than the reformed schemes. We will assume that this additional cost would have reduced the disposable income of the working age population in 2050. In other words, we are assuming that the burden of maintaining current system generosity would have been borne solely by workers in 2050. Since the incomes for the working age generation in 2050 will be lower under the pre-reform systems, the relative generosity of the latter will be higher relative to contemporary earnings than the post-reform systems.

7.11 Comparing the financial sustainability of the pre- and post-reform systems in 2050

Given that the difference in the financing burden of maintaining pension systems unchanged is assumed to affect the level of disposable income in 2050, we will start by looking at the future contribution rates required by the pre-reform systems to finance their implied pension wealth. These estimates, presented in Table 7.1, clearly show the substantial contribution towards financial sustainability exerted by the pension reforms. Across these ten countries, the contribution rate would, on average, have had to more than double from 11% to 24%. The pension reforms enacted between the early 1990s and 2008 are estimated to have curtailed the required increase in contribution rates, on average, to just 7 percentage points (down from 13 under unreformed systems). The reforms particularly reduced the pace of growth in financing

[159] This assumption will be relaxed in later Chapters.

requirements in Poland and Slovakia, where the pre-reform financing requirement of the pension system would have more than tripled. The contribution rates in Hungary and Italy would have necessitated rising beyond a third of wages.

*Table 7.1: Long-term contribution rates (% of total lifetime wages)**

	2005	*Pre-reform 2050*	*Post-reform 2050*
Austria	13.8	27.3	22.7
Finland	8.5	20.4	18.3
France	14.6	29.6	24.3
Germany	8.0	17.9	14.4
Hungary	22.0	43.0	30.8
Italy	17.3	34.1	24.7
Poland	8.4	30.4	20.7
Slovakia	11.1	35.9	24.6
Sweden	10.1	18.3	16.7
UK	5.8	7.1	6.7
Average^	**11.1**	**23.6**	**18.3**

** This gives the proportion of total lifetime wages needed to finance the net pension wealth of different pensioner generations given system dependency ratios. Note that here we are assuming that all those of working age participate in full-time labour market activity.*
^ The contribution rate of each country is weighted in line with the relative size of its population.
Source: Own workings using APEX and Eurostat population projections.

The reforms have resulted in a substantial improvement in the relative position of some countries. In the absence of reforms, Poland would have slipped from having the third-lowest contribution requirement in 2050 to close to being fourth-from-top. Similarly Slovakia would have slipped from being one of the countries in the middle of the contribution table to being third-from-top. The reforms have also decreased the potential difference in contribution rates among the ten countries. If pension systems had remained unchanged, long-term contribution requirements in 2050 would have ranged from 7% in the UK to 43% in Hungary. After reforms the range lies from 7% in the UK to 31% in Hungary.

The higher generosity of pre-reform systems accounts for the bulk of the difference in financing requirements in 2050. However it is interesting to note that even in Hungary and the UK, where reforms raised generosity, financial sustainability improved. This occurred because in both countries the potential size of pensioner cohorts in 2050 was reduced significantly by raising the pension age, particularly for women.[160] This policy greatly diminishes the cost to maintain an effective pension system, if the increase in the state pension age is accompanied

[160] In Hungary the age for men and women rose to 62 (from 60 and 55) and to 68 in the UK (from 65 and 60).

by extended working lives. In fact, Table 7.1 would be significantly different if this assumption is not made. The case for Hungary and Slovakia, in particular, would be less rosy.

Table 7.2 presents the drop in disposable income in 2050 had no pension reforms taken place – i.e. the difference in 2050 between the financing requirements of the unreformed and the reformed systems. This difference in Poland, Hungary, Italy and Slovakia is close to 10 percentage points, whereas it is close to or less than 2 percentage points in the UK, Finland and Sweden. This suggests that whereas the social sustainability indicators in the first group of countries might improve significantly, those in the second will remain similar.

Table 7.2: Fall in disposable income of working age generation in 2050 without reforms

	%
Austria	4.7
Finland	2.1
France	5.4
Germany	3.5
Hungary	12.3
Italy	9.4
Poland	9.7
Slovakia	11.3
Sweden	1.6
UK	0.4

Source: Own workings using APEX and Eurostat population projections.

7.12 The intergenerational balance constraint over time - pre- and post-reform

After having assessed the cost of maintaining pension systems unchanged, we can evaluate the impact on the second constraint - intergenerational balance. This will be done by comparing the net pension wealth of the 2005 and 2050 pensioner generations, the latter under both the pre- and the post-reform pension rules. Note that the net pension wealth indicator under the pre-reform systems in 2050 is expressed in terms of a lower annual average disposable wage.

As can be seen in Table 7.3, the net pension wealth to which the 2050 pensioner generation would have been entitled was much greater under the unreformed systems. Even in Hungary, where benefit rules became more generous, there is a loss as the pension age has been increased faster than life expectancy. The reforms appear to have broken the strong correlation between longevity and net pension wealth in all countries, particularly in Eastern Europe where longevity is set to improve significantly. The biggest losers appear to be women in Italy, Slovakia and, particularly, Poland. On the part of men, the worst relative losses are those registered in Italy, Poland and Germany. Aside from the UK and Hungary,

where the effects of a higher state pension age are offset by much more generous benefit rules, the least affected future pensioners appear to be those in Scandinavian countries.

*Table 7.3: The net pension wealth of the 2005 and 2050 pensioner generations^*

	Men			**Women**		
	Net Pension Wealth 2005*	Pre-reform Ratio 2050 to 2005 (%)	Post-reform Ratio 2050 to 2005 (%)	Net Pension Wealth 2005*	Pre-reform Ratio 2050 to 2005 (%)	Post-reform Ratio 2050 to 2005 (%)
Austria	13.4	124	109	17.1	115	98
Finland	10.6	124	114	13.1	117	106
France	12.7	118	98	15.5	114	96
Germany	12.2	124	92	14.1	119	95
Hungary	12.9	139	131	17.7	121	104
Italy	13.8	120	95	17.4	114	87
Poland	10.0	131	106	15.8	113	69
Slovakia	11.0	133	109	16.8	119	79
Sweden	10.1	117	107	12.5	112	100
UK	5.7	122	127	8.8	114	112

^ *These ratios are the averages for the 9 different hypothetical individuals.*
* *Expressed as a factor of the annual average disposable wage.*
Source: Own analysis using APEX.

To better illustrate the effect of reforms on pension wealth generosity, Table 7.4 shows a synthetic replacement rate, derived by dividing net pension wealth – total pension transfers defined in terms of years of contemporary average wages - by the number of years to be spent in retirement under the pre- and post-reform systems. This approach, which standardises net pension wealth by the length of time it is meant to cover, indicates that except for Hungary and the UK, 2050 pensioners will be less well-off under the reformed systems. The main losers are pensioners (especially women) in Poland, who are projected to be 30% less well-off, followed by those in France, Slovakia, Italy and Germany, where the drop is of approximately 15%. By contrast, the 2050 pensioner generation in Austria, Sweden and Finland should be between 5% and 10% worse off under the post-reform systems.

Table 7.4 also indicates that even under the pre-reform systems, in several countries there would have been a slight decline in the 'overall' replacement rate. This is mostly on account of the indexation of pensions post-retirement. Most countries have adopted price indexation, and as a result, longer periods in retirement result in the relative value of the pension falling. The decline for women is more marginal than that for men, as with longer

periods in retirement, relatively more women would end up on minimum pension provisions during their later years, which act as a safety net.

Table 7.4: Net pension wealth^ divided by the number of years spent in retirement (%)

	Men			***Women***		
	2005	*Pre-reform 2050*	*Post-reform 2050*	*2005*	*Pre-reform 2050*	*Post-reform 2050*
Austria	79	72	63	66	64	65
Finland	66	63	57	62	61	56
France	55	54	44	55	53	45
Germany	72	69	56	67	67	59
Hungary	72	72	74	63	65	71
Italy	77	75	60	64	64	58
Poland	71	65	53	66	64	39
Slovakia	61	61	54	65	67	53
Sweden	56	56	52	60	56	50
UK	33	33	40	35	36	49

^ *This net pension wealth is the average of those for the 9 different hypothetical individuals. Since entitlement is defined as the number of years worth of average wages, by dividing it with the number of years expected in retirement, one gets a replacement rate as a % of average wages.*
Source: Own analysis using APEX.

The fact that nearly all of the 2050 pensioner generation are worse off as a result of the reforms does not, however, imply that they will have lower net pension wealth than the 2005 generation. As was shown in Chapter 6, this is the case only in 6 out of the 10 countries (and in 8 countries if one looks only at women). However, comparing the pre- and post-reform pension wealth clearly shows that the reforms have been quite comprehensive in limiting the potential future growth of these entitlements. Table 7.5 indicates that nearly all of the 2050 generation lost out as a result of the reforms, and in some cases the decline is quite hefty. In Germany, the 2050 male generation lost nearly a third of their potential entitlements, while in Poland and Italy the loss was close to a quarter, and a fifth in Slovakia and France. The number of women affected by the reforms is significantly higher, though in some cases their average loss is less than that for men. This reflects the fact that most of the reforms involved the equalisation of pension ages. Interestingly the loss is highest in Poland, where the pension age for women remains below that for men. This suggests that while equalisation may not have been legislated, there are now strong financial incentives for women to retire at the same age as men.

Table 7.5: Projected proportion of the 2050 generation with lower net pension wealth and size, on average, of the drop as a result of the pension reforms

	Men			*Women*		
	% of 2050 Generation with lower pension wealth	*Average % decline in pension wealth*	*Index of pension wealth loss**	*% of 2050 Generation with lower pension wealth*	*Average % decline in pension wealth*	*Index of pension wealth loss**
Austria	100	15	15	**100**	**17**	**17**
Finland	100	10	10	100	11	11
France	**100**	**20**	**20**	**100**	**18**	**18**
Germany	**100**	**32**	**32**	**100**	**24**	**24**
Hungary	100	8	8	100	17	17
Italy	**100**	**25**	**25**	**100**	**27**	**27**
Poland	100	25	25	**100**	**44**	**44**
Slovakia	89	24	21	**100**	**40**	**40**
Sweden	78	14	11	**89**	**15**	**13**
UK	67	9	6	**67**	**17**	**11**

** The index is estimated by multiplying the % of the 2050 generation with lower pension wealth as a result of the reforms with the average % decline in its pension wealth. A value of 0 implies that there is no pension wealth loss, while a value of 100 would imply that all pensioners in 2050 had no net pension wealth at all as a result of the reforms.*

Note: While the reforms may have lowered the pension wealth of the 2050 generation, this does not necessarily imply that the pension wealth of this generation is lower than that of the 2005 generation. The cases when this is the case are shown in bold.

Source: Own analysis using APEX.

Table 7.5 suggests that they are some 'winners' within the 2050 cohort. Figure 7.1 presents this graphically by showing the change in the ratio of net pension wealth of the 2050 and 2005 generations pre- and post-reform for the 9 hypothetical full-career individuals. It shows that while reforms have reduced the potential generational imbalance by reducing the net pension wealth of the 2050 generation closer to that of the 2005 generation, there are important distributional differences. In Austria and France, those on lower incomes register the lowest drops in net pension wealth. In Germany, and more especially in the UK, those at the bottom deciles end up better off after the reforms. However, those on medium-to-high incomes are worse off after the reforms in terms of the growth in their pension wealth.

By contrast in the Eastern European states under study, the reforms favour those at the higher wage deciles. In Slovakia and Poland, while the net pension wealth of those at the bottom deciles in 2050 is projected to be lower, that of those at the top deciles should be higher. This distinction would not have arisen under the previous systems. Thus intergenerational balance is achieved by disadvantaging those at the bottom of the income distribution. In Hungary and Sweden the reforms also favour those at the top deciles, but the bottom deciles should still have higher pension wealth than the 2005 pensioner cohort. No

distinctive income distribution differences in the change in pension wealth are evident in Finland and Italy.

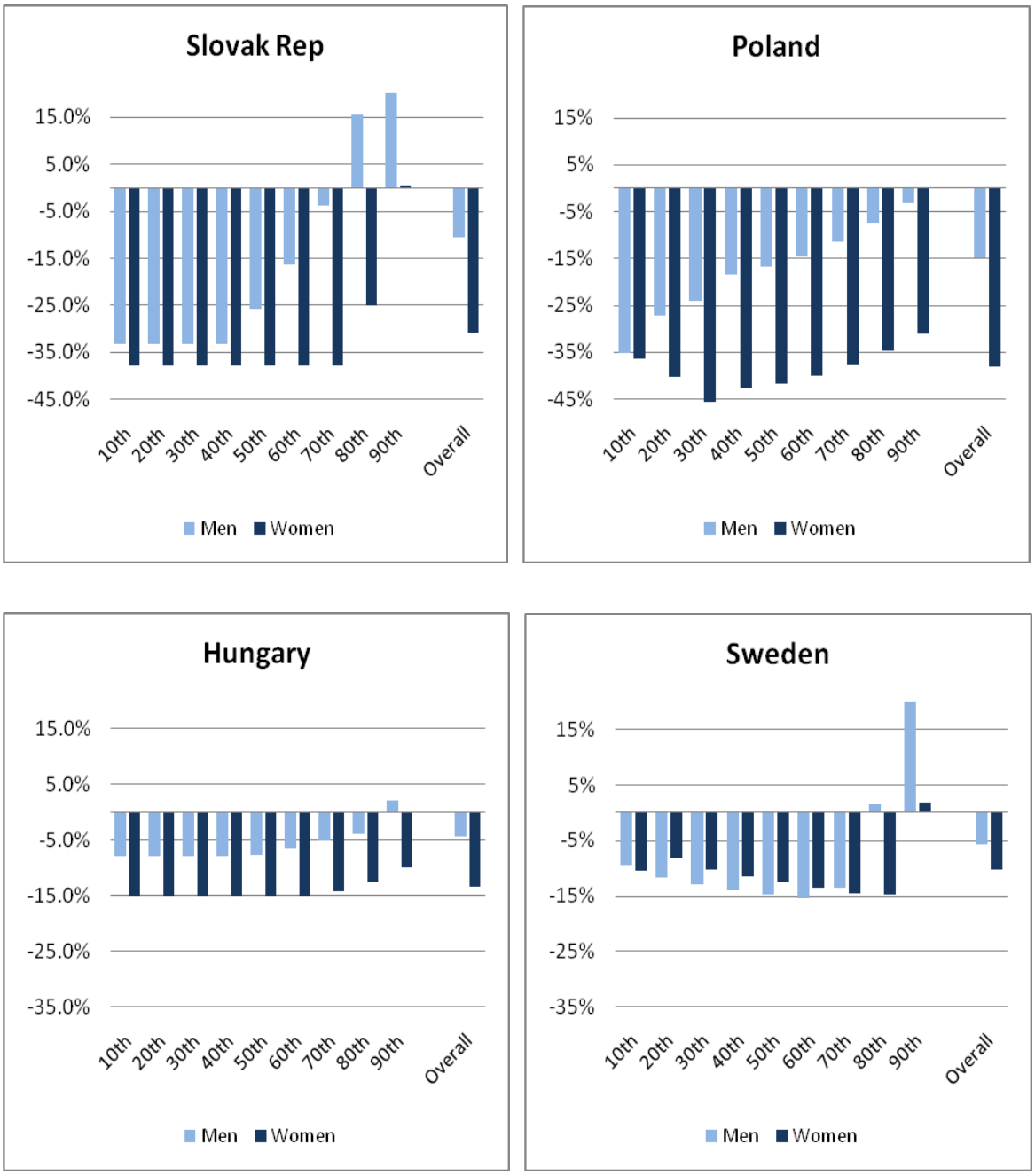
*Figure 7.1: The effect of reforms on intergenerational balance**

Countries where reforms favoured the bottom half of the wage distribution

** This compares the net pension wealth defined in monetary terms for the 2050 generation under the pre- and post-reform systems. Note that even if there are losses, this does not imply that the pension wealth of the 2050 generation is below that of the 2005 generation. Refer to Chapter 6 for this comparison.*

Figure 7.1: The effect of reforms on intergenerational balance....continued*

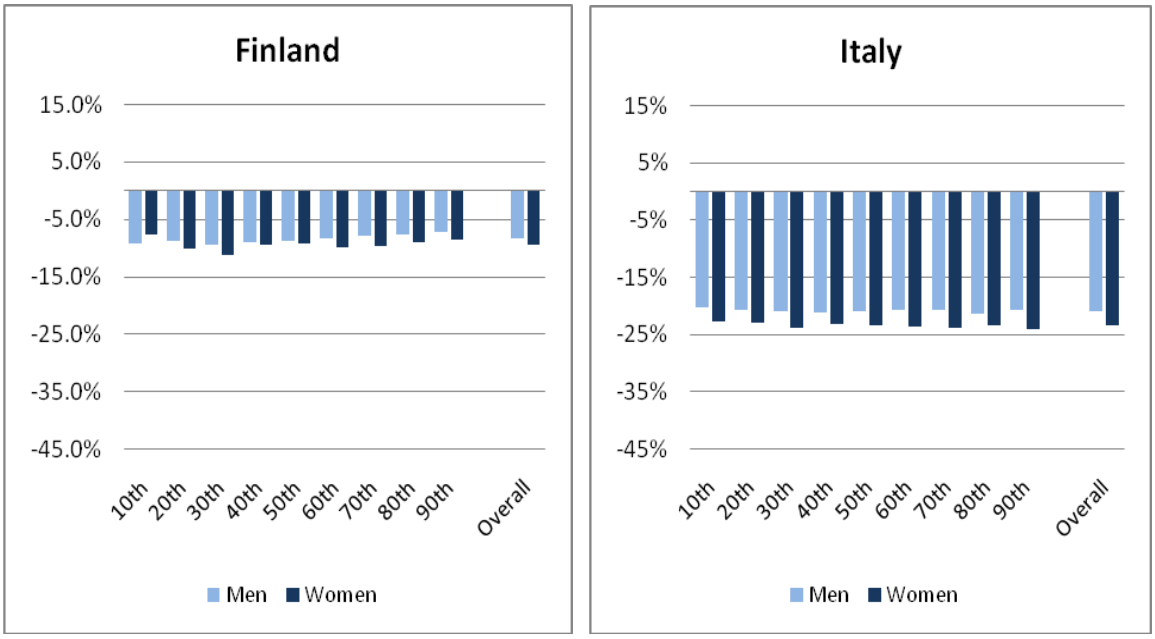
Countries where reforms favoured the top half of the wage distribution



** This compares the net pension wealth defined in monetary terms for the 2050 generation under the pre- and post-reform systems. Note that even if there are losses, this does not imply that the pension wealth of the 2050 generation is below that of the 2005 generation. Refer to Chapter 6 for this comparison.*

Figure 7.1: The effect of reforms on intergenerational balance...continued*

Countries where reforms were distribution-neutral



** This compares the net pension wealth defined in monetary terms for the 2050 generation under the pre- and post-reform systems. Note that even if there are losses, this does not imply that the pension wealth of the 2050 generation is below that of the 2005 generation. Refer to Chapter 6 for this comparison.*

7.13 Poverty alleviation over time under the pre- and post-reform systems

When considering the impact of reforms on achievement of system objectives, the first thing to note is that pre-reform systems in most countries imply longer retirement and hence larger net pension requirements to achieve the same aims. This is particularly so for women (see Table 7.6). Under pre-reform systems, on average, across all countries net pension wealth would have had to increase by 23% for men and by 13% for women to ensure that individuals, on average, have an annual income which keeps them above the poverty threshold of 35% of the average disposable wage. The reforms cut this increase down to 18% for men and just 3% for women.

*Table 7.6: The development over time of the net pension requirement**

	Men			Women		
	2005	Pre-reform 2050	Post-reform 2050	2005	Pre-reform 2050	Post-reform 2050
Austria	5.1	6.5	6.5	7.2	8.2	7.2
Finland	4.9	6.1	6.1	6.1	6.9	6.9
France	6.5	7.7	7.7	7.6	8.5	8.5
Germany	5.1	6.2	5.8	6.0	7.0	6.6
Hungary	5.3	7.0	6.6	7.5	8.6	7.2
Italy	5.3	6.3	6.3	7.4	8.2	7.2
Poland	4.2	5.9	5.9	6.7	7.7	7.7
Slovakia	5.3	6.7	6.2	7.1	8.0	7.0
Sweden	5.3	6.1	6.1	6.2	6.9	6.9
UK	5.0	6.0	5.3	7.0	7.5	5.7

** The net pension wealth which would guarantee an annual income flow that would keep an individual above the poverty threshold over the whole retirement period.*
Source: Own analysis using Eurostat population projections.

Table 7.7 shows the poverty threshold that net pension wealth generates in 2005 and compares this with forecasts for 2050 under the reformed and the unchanged systems. A priori one would expect that having to cater for longer periods of retirement leads systems to become less effective. However, it must be kept in mind that pension systems are underpinned by minimum pensions. Moreover the larger financial cost of pre-reform systems depresses the disposable wage and lowers the poverty threshold over time. That said, even under an unchanged threshold, retaining the pre-reform systems would, on average, not have resulted in a significantly less effective poverty alleviation function.

Table 7.7: The poverty alleviation function over time – the poverty threshold (% of median disposable income), on average, covered by pension systems in 2005 and 2050

	Men			Women		
	2005	Pre-reform 2050	Post-reform 2050	2005	Pre-reform 2050	Post-reform 2050
Austria	96	110	85	69	82	70
Finland	79	83	72	70	74	64
France	73	82	62	67	76	59
Germany	69	77	58	55	62	52
Hungary	79	127	82	73	119	79
Italy	99	130	78	79	107	71
Poland	77	88	54	68	81	39
Slovakia	102	151	77	82	122	62
Sweden	72	75	64	60	63	54
UK	48	51	61	41	46	60

** These ratios are the averages for the 4 hypothetical individuals with below-median wages.*
Source: Own analysis using APEX.

Table 7.8: Years in poverty under pre-reform systems, assuming unchanged poverty threshold

a) Men

	10th		*20th*		*30th*		*Average for 10th to 50th*		*Average for all deciles*	
	2005	*2050*	*2005*	*2050*	*2005*	*2050*	*2005*	*2050*	*2005*	*2050*
Austria	0	0	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0	0	0	0
France	8	10	4	5	1	2	3	4	1	2
Germany	17	21	1	2	0	0	4	5	2	3
Hungary	2	1	0	0	0	0	0	0	0	0
Italy	0	0	0	0	0	0	0	0	0	0
Poland	1	12	0	2	0	0	0	3	0	2
Slovakia	0	0	0	0	0	0	0	0	0	0
Sweden	7	6	0	0	0	0	1	1	1	1
UK	17	21	17	21	17	21	17	21	12	13

b) Women

	10th		*20th*		*30th*		*Average for 10th to 50th*		*Average for all deciles*	
	2005	*2050*	*2005*	*2050*	*2005*	*2050*	*2005*	*2050*	*2005*	*2050*
Austria	13	14	5	6	2	2	4	4	2	2
Finland	0	0	0	0	0	0	0	0	0	0
France	16	17	8	9	4	5	6	7	3	4
Germany	21	25	21	23	11	10	11	12	6	7
Hungary	9	7	3	3	0	0	2	2	1	1
Italy	3	1	0	0	0	0	0	0	0	0
Poland	18	19	11	12	4	4	7	8	4	5
Slovakia	4	3	0	0	5	3	2	1	1	1
Sweden	21	25	13	16	5	6	8	10	5	6
UK	25	28	25	28	25	28	25	28	22	23

Source: Own projections using APEX.

However, with an unchanged threshold, the years at-risk-of-poverty would have increased in many countries, especially in Poland, Germany and France (see Table 7.8). Table 7.9 looks at the proportion of retirement at-risk-of-poverty and the depth of poverty, again assuming unchanged poverty thresholds. For men, the picture is very clear – the reforms (except in the UK) could result in more years at-risk-of-poverty, but except in Poland and France the depth of poverty is not projected to increase significantly. For women there is a greater variation. In most countries, except in Hungary and the UK (and to some extent Austria), the proportion of retirement at-risk-of-poverty is expected to rise – with substantial increases in Poland, Germany, Slovakia, France and Sweden. The projected trend in the depth of poverty, however, is less striking. Only in Poland there could be a significant deterioration, while in many countries there could be a lower or a stable depth of poverty. This reflects the

fact that in most countries, the reforms have been accompanied by better minimum pension schemes, which act as a safety net, particularly for women.

Table 7.9: Projected proportion of retirement at risk-of-poverty and depth of poverty in 2050, assuming unchanged poverty thresholds

a) Men

	10th to 50th wage deciles						*All deciles*	
	% of retirement at-risk-of-poverty		*Depth of risk-of-poverty*		*Index of risk-of-poverty**		*Index of risk-of-poverty**	
	Pre-reform	Post-reform	Pre-reform	Post-reform	Pre-reform	Post-reform	Pre-reform	Post-reform
Austria	0%	1%	0%	1%	0.0	0.0	0.0	0.0
Finland	0%	1%	0%	1%	0.0	0.0	0.0	0.0
France	12%	41%	0%	11%	1.0	4.5	0.5	2.5
Germany	21%	40%	11%	15%	2.3	6.0	1.4	3.4
Hungary	1%	0%	1%	0%	0.0	0.0	0.0	0.0
Italy	0%	2%	0%	1%	0.0	0.0	0.0	0.0
Poland	14%	55%	8%	22%	1.1	12.4	0.0	6.9
Slovakia	0%	8%	0%	5%	0.0	0.4	0.0	0.2
Sweden	6%	27%	5%	6%	0.3	1.5	0.2	0.8
UK	100%	39%	18%	3%	17.6	1.0	11.1	0.6

b) Women

	10th to 50th wage deciles						*All deciles*	
	% of retirement at-risk-of-poverty		*Depth of risk-of-poverty*		*Index of risk-of-poverty**		*Index of risk-of-poverty**	
	Pre-reform	Post-reform	Pre-reform	Post-reform	Pre-reform	Post-reform	Pre-reform	Post-reform
Austria	15%	16%	8%	7%	1.2	1.2	0.6	0.7
Finland	0%	16%	0%	4%	0.0	0.6	0.0	0.3
France	21%	47%	8%	12%	1.8	5.5	1.0	3.1
Germany	52%	79%	17%	15%	9.1	11.9	4.5	6.0
Hungary	9%	0%	4%	0%	0.4	0.0	0.1	0.0
Italy	2%	9%	3%	4%	0.1	0.4	0.0	0.2
Poland	13%	100%	8%	33%	1.0	33.4	1.4	19.5
Slovakia	7%	33%	11%	13%	0.8	4.2	0.2	2.3
Sweden	39%	67%	14%	14%	5.4	9.7	3.1	5.4
UK	100%	66%	32%	3%	32.2	2.0	17.9	0.5

** An index value of 100 implies all concerned are always without any income in retirement, whereas an index value of 0 implies that no one ever spends a year with an income below the poverty threshold.*
Note: The proportion of retirement at-risk-of-poverty is estimated by summing up the total years during which the pension would be below the poverty threshold for the hypothetical individuals, and then expressing as a % of the total years in retirement. The depth of risk-of-poverty is estimated by summing for those years at-risk-of-poverty for the hypothetical individuals the difference between the pension level and the poverty threshold, and then expressing it as a % of the poverty threshold for those years.
Source: Own analysis using APEX.

7.14 Consumption smoothing over time under the pre- and post-reform pension systems

The next step is to see how maintaining pension systems unchanged would have affected the strength of the consumption smoothing function. Chapter 6 indicated that at present state systems are able to provide, on average, during the post-retirement period an annual income flow above 60% of previous income (except in the UK, where income replacement is only strong for those on low incomes). Across the ten countries, the projected overall replacement rate of the post-reform pension systems in 2050 is projected to be about twelve and eight percentage points less than it was in 2005 for men and women, respectively. By contrast, Table 7.10 suggests that when one considers the drop in disposable income due to the higher cost of unreformed systems, the replacement rate would have increased significantly in most cases. Only in the UK the post-reform replacement rate is higher than it would have been under the pre-reform rules.

Table 7.10: The replacement rate, on average, of pension systems in 2005 and 2050 (%)

	Men			*Women*		
	2005	*Pre-reform 2050*	*Post-reform 2050*	*2005*	*Pre-reform 2050*	*Post-reform 2050*
Austria	91	110	78	83	105	82
Finland	75	78	69	75	81	70
France	68	77	57	71	81	61
Germany	85	96	68	82	95	71
Hungary	85	162	90	83	158	90
Italy	92	130	72	82	120	73
Poland	87	93	63	86	99	50
Slovakia	72	120	67	83	137	67
Sweden	66	69	62	71	74	64
UK	40	44	48	44	51	60

** These ratios are the averages for the 9 different hypothetical individuals.*
Source: Own analysis using APEX.

In terms of differential gender impacts, the reforms in Poland and Slovakia appear to have mostly affected women. Conversely women in most other countries suffer a smaller reduction in consumption smoothing compared to men. This reflects the fact that many reforms were progressive, and impacted more on pension generosity for higher earners (and these tend to be mainly male). This in a way can be held as compensating for pension age gender equalisation.

Adopting a 60% replacement rate benchmark, Table 7.11 indicates that reforms have tended to weaken income smoothing for the middle part of the wage distribution in France,

Poland and Sweden, and marginally also in Slovakia, Austria and Italy. In France, Poland and Sweden, a substantial proportion of the population are no longer projected to have replacement rates of 60% throughout their retirement, though in Sweden they will be getting only marginally less.[161] In the UK, despite the improvements in generosity, the income replacement function of state pensions remains quite weak, particularly for men. It is interesting to note that the gap for the whole population differs in some cases from that of the middle part of the wage distribution. For example, in Poland (and to some extent, in Sweden) when one looks at the population as a whole, the decline in the strength of the consumption smoothing function due to the reforms is lower than that when one looks at just the middle part of the wage distribution. This reflects the improvement in replacement rates for those on higher incomes as a result of the reforms.

Table 7.11: Projected proportion of retirement with replacement rate less than 60% and size of gap from this threshold

a) Men

	30th to 70th wage deciles							*All deciles*	
	Proportion of retirement with low replacement		*Magnitude of replacement gap*		*Index of replacement gap**			*Index of replacement gap**	
	Pre-reform	Post-reform	Pre-reform	Post-reform	Pre-reform	Post-reform		Pre-reform	Post-reform
Austria	0%	5%	0%	5%	0.0	0.3		0.0	1.4
Finland	0%	0%	0%	0%	0.0	0.0		0.0	0.0
France	0%	71%	0%	12%	0.0	8.6		0.0	9.5
Germany	0%	2%	0%	1%	0.0	0.0		0.0	0.1
Hungary	0%	0%	0%	0%	0.0	0.0		0.0	0.0
Italy	0%	0%	0%	0%	0.0	0.0		0.0	0.0
Poland	0%	40%	0%	6%	0.0	2.6		0.0	2.5
Slovakia	0%	9%	0%	2%	0.0	0.2		0.0	0.3
Sweden	0%	74%	0%	4%	0.0	3.3		1.5	2.0
UK	100%	100%	26%	23%	26.0	23.0		27.4	23.8

** An index value of 100 implies that all are always without any income during retirement, whereas an index value of 0 implies that no one spends a year with an income below 60%.*
Note: The proportion of retirement with low replacement is the number of years during with a replacement rate below 60% expressed as a % of the years spent in retirement. The magnitude of replacement gap is estimated by summing for the years at risk of low replacement the difference between the replacement rate and 60%, and then expressing it as a % of the latter for those years.
Source: Own analysis using APEX.

[161] Note individuals are assumed to retire at age 65 in 2050, which is unlikely given the incentives of the NDC system. Moreover the projections for Poland assume women retire at 60, again unlikely given the incentives they face.

Table 7.11: Projected proportion of retirement with replacement rate less than 60% and size of gap from this threshold…continued

b) Women

	30th to 70th wage deciles							*All deciles*	
	Proportion of retirement with low replacement		*Magnitude of replacement gap*		*Index of replacement gap**			*Index of replacement gap**	
	Pre-reform	Post-reform	Pre-reform	Post-reform	Pre-reform	Post-reform		Pre-reform	Post-reform
Austria	0%	0%	0%	0%	0.0	0.0		0.0	0.2
Finland	0%	2%	0%	3%	0.0	0.0		0.0	0.0
France	0%	54%	0%	11%	0.0	6.1		0.0	5.6
Germany	0%	3%	0%	1%	0.0	0.0		0.0	0.0
Hungary	0%	0%	0%	0%	0.0	0.0		0.0	0.0
Italy	0%	2%	0%	4%	0.0	0.1		0.0	0.0
Poland	0%	100%	0%	24%	0.0	23.8		0.0	20.1
Slovakia	0%	5%	0%	1%	0.0	0.1		0.0	0.2
Sweden	0%	48%	0%	5%	0.0	2.5		0.2	2.2
UK	100%	60%	16%	12%	16.0	6.9		16.8	11.6

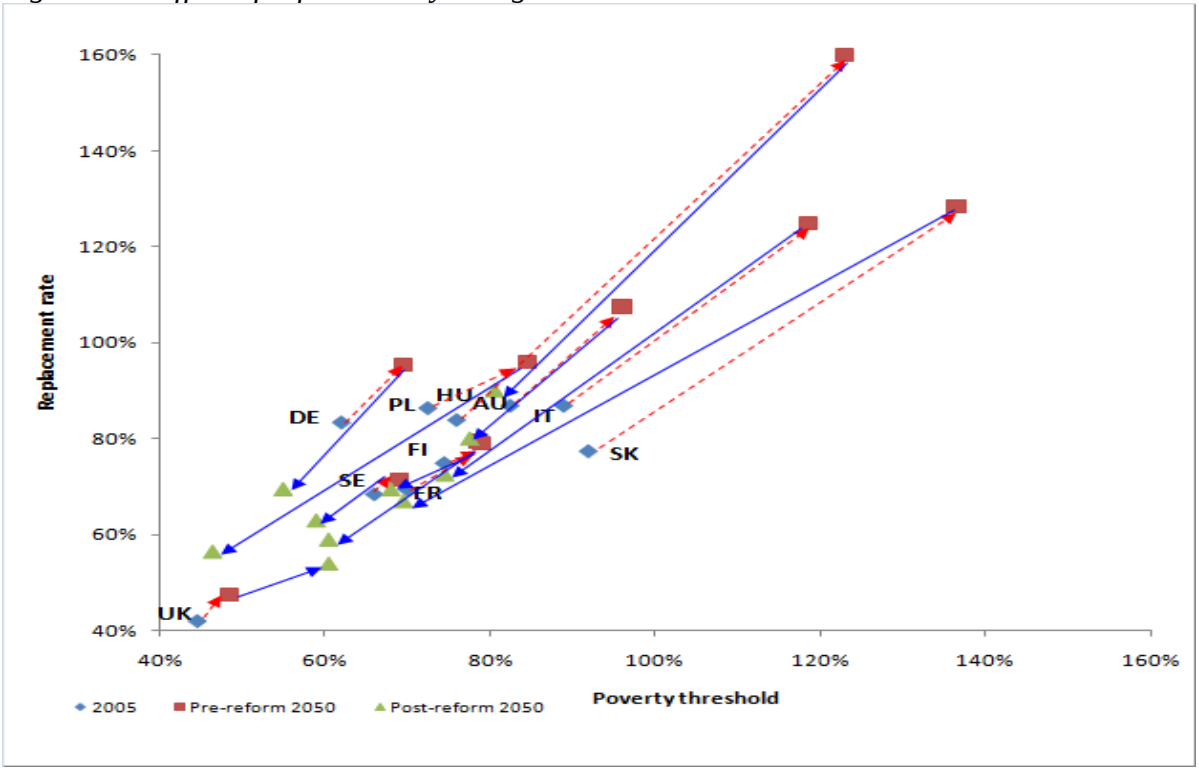
** An index value of 100 implies that all are always without any income during retirement, whereas an index value of 0 implies that no one spends a year with an income below 60%.*
Note: The proportion of retirement with low replacement is the number of years during with a replacement rate below 60% expressed as a % of the years spent in retirement. The magnitude of replacement gap is estimated by summing for the years at risk of low replacement the difference between the replacement rate and 60%, and then expressing it as a % of the latter for those years.
Source: Own analysis using APEX.

7.2 Overall comparison over time of the pre-reform with the post-reform systems

In synthesis, the above analysis suggests that while pre-reform systems would have maintained the same degree of efficacy in achieving goals,[162] they would have done so at the risk of overstepping constraints. Figures 7.2 and 7.3 clearly illustrate this. Leaving systems unchanged in the face of changing longevity and the size of the pensioner population would have resulted in notable pressures. For some countries, such as Hungary and Italy, the implied levels of taxation would have been staggering. Slovakia, Austria and Poland would have also faced very serious financial and generational issues, while Germany, France and Finland present a more intermediate, though still worrying, case. By contrast, the UK and Sweden stand out as facing the lowest risks among the ten countries under study. This reflects partly the limited consumption smoothing function of the state pension systems in these countries.

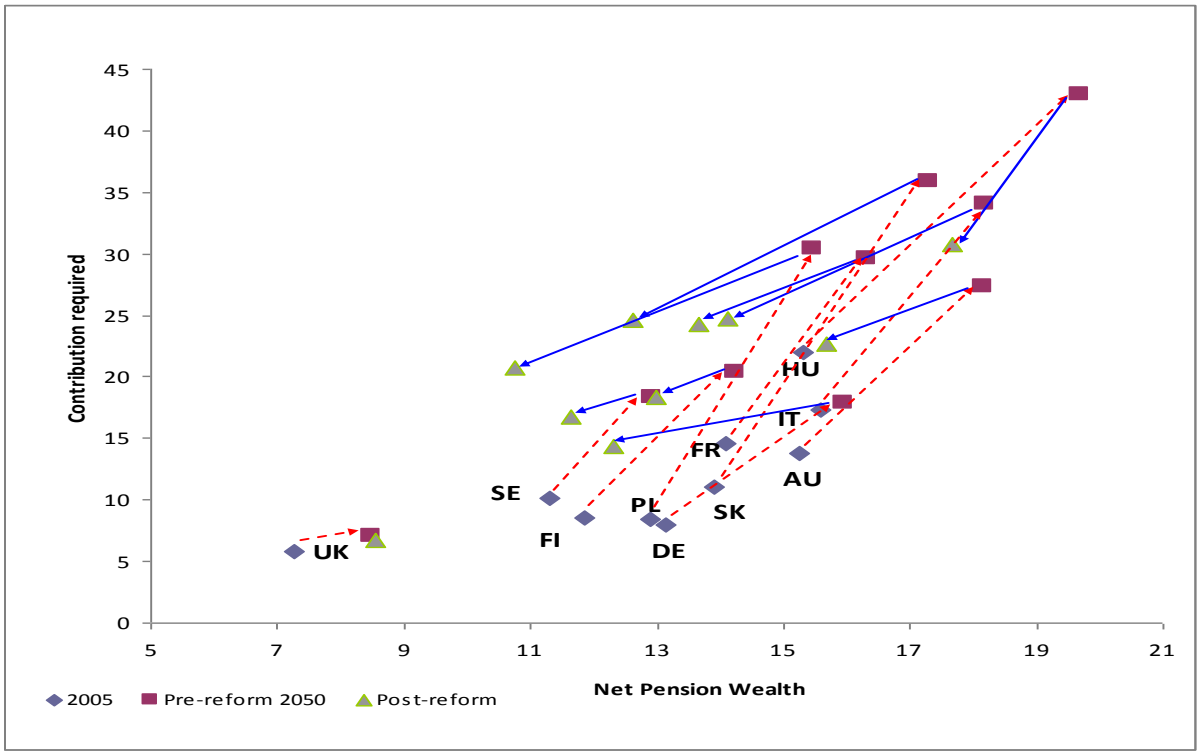
[162] Or indeed, improved on it, if one takes into account the drop in disposable income which would have accompanied the lack of reforms.

Figure 7.2: Effect of reforms on system goals



Note: Red lines stand for the change in goals which would have occurred had systems remained unchanged, while the blue lines show the correction due to the pension reforms. In most cases the increase in aims reflects a drop in disposable income due to higher contribution rates.

Figure 7.3: Effect of reforms on system constraints



Note: Red lines stand for the change in pension system constraints in the absence of reforms, while the blue lines show the correction due to the impact of pension reforms.

Note that in most cases, the improvement in system goals of pre-reform systems would have simply reflected the lower disposable income of future working generations due to higher contributions. Only in the UK, the reforms actually enhance further the improvement in poverty alleviation and consumption smoothing over what would have occurred over time had the pension system remained unchanged. While the impact of reforms on system goals is strongest in Hungary and Slovakia, the difference compared to 2005 is not so large. Italy has the third-strongest effect induced by reforms, and this not only offsets the development which would have occurred under an unchanged system, but also reduces the achievements of the pension system significantly compared to 2005. By contrast, even though the size induced by the change in Poland and Germany would seem intermediate, when one considers the starting point, the reforms had a large relative impact. This is also true, to a lesser extent, for Austria and France.

The reforms in Germany and Italy undid the rise in pressure on constraints of unchanged systems. Poland and Slovakia also appear to have offset large part of the anticipated stress on system constraints, even though they faced the second- and third-largest challenges. Hungary and Finland have managed to redress part of the increased demands of the pension system, but face the largest relative pressures among the ten countries. The Austrian reforms also appear to not have reduced the strain on constraints that much.

While quite illustrative of the overall changes occurring across the ten countries, Figures 7.2 and 7.3 are quite difficult to interpret due to the clustering of data points and the presence of some outlying cases such as the UK and Hungary. Hence, Figure 7.4 represents these changes on a country-by-country basis. When looking at the diagrams on the effect of reforms on goals, when the post-reform arrow is steeper than the pre-reform arrow, the reforms, on average, favour the poverty alleviation function over the consumption smoothing one. That is, the impact of the reforms is stronger on replacement rates than on achievable poverty thresholds. This appears to be the case especially in Austria and Germany. By contrast, in Poland and Slovakia, but also to some extent in Hungary and Sweden, the loss in the poverty alleviation function is relatively stronger than that in consumption smoothing.

Turning to the pressure on constraints, the slope indicates the extent to which net pension wealth has been lowered. A downward-pointing line would imply a drop in the contribution rate, unaccompanied by any decline in net pension wealth. The country that comes closest to having this is the UK, where the large increase in state pension age enables a decline in the contribution rate while net pension wealth remains relatively unchanged from the pre-reform case in 2050 as the shorter retirement period is offset by more generous pension

rules. By contrast in other countries, the arrows have a flatter slope. Here the decline caused by the reforms in the projected required contribution rate is partially financed by less generous pension wealth.

Figure 7.4: Development in social sustainability indicators- country-by-country analysis

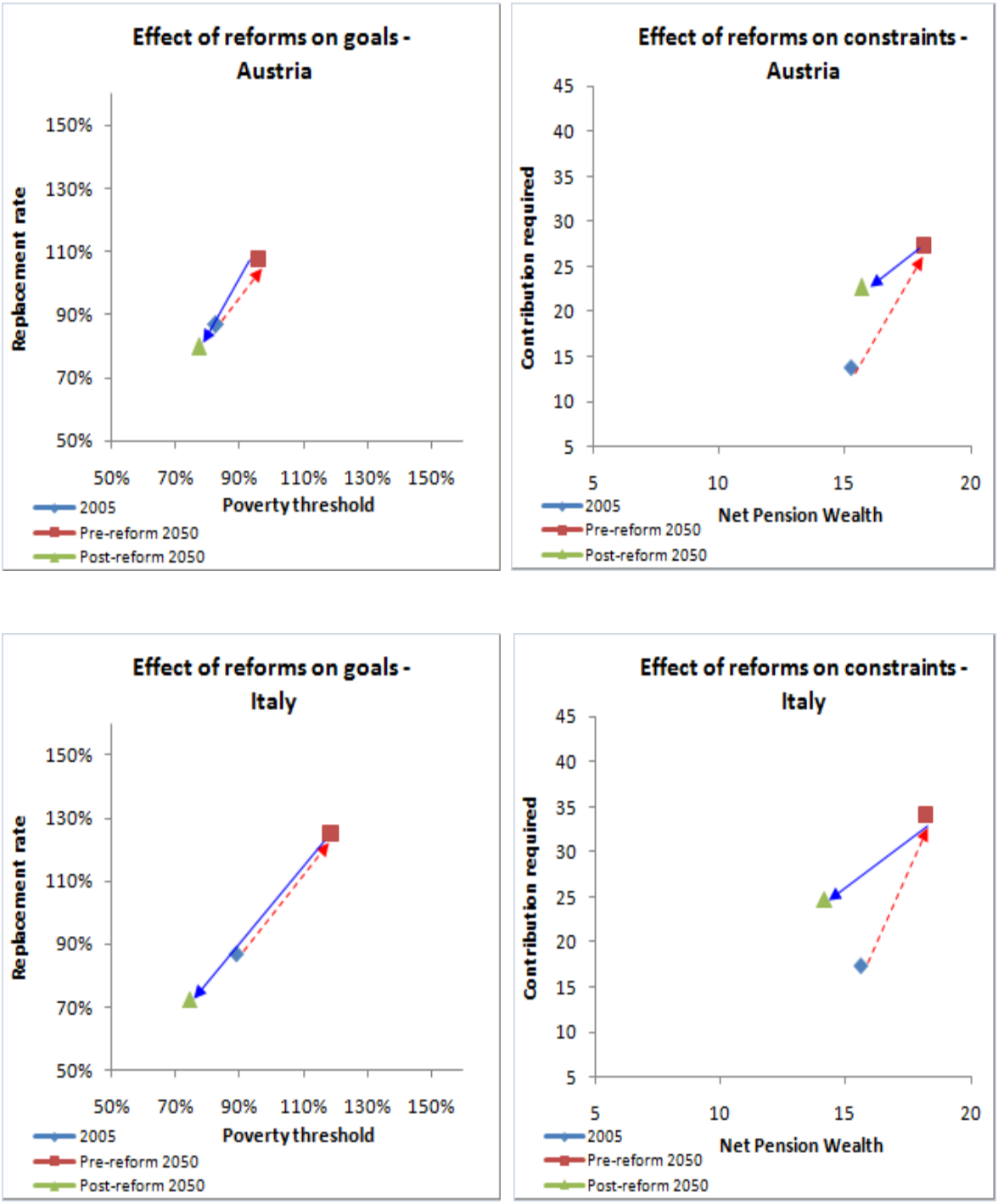
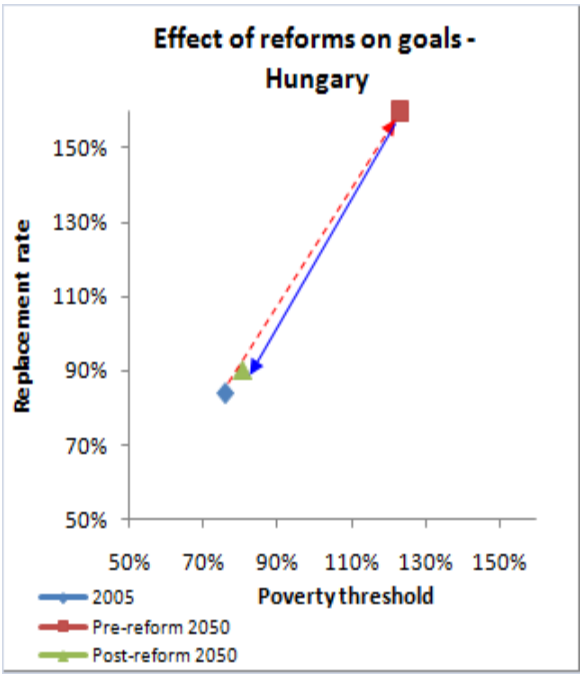
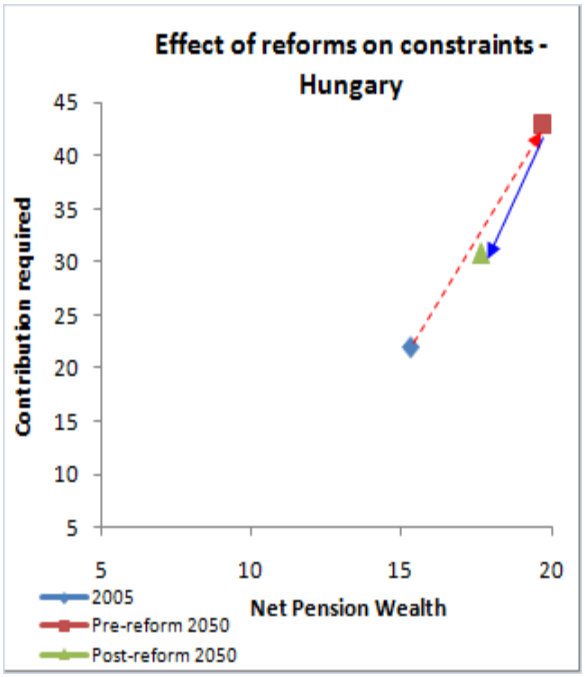
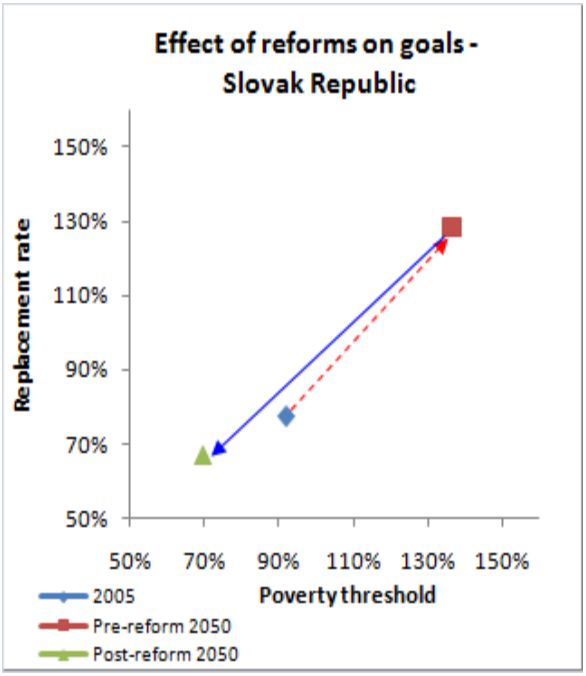


Figure 7.4: Development in social sustainability indicators- country-by-country analysis..cont







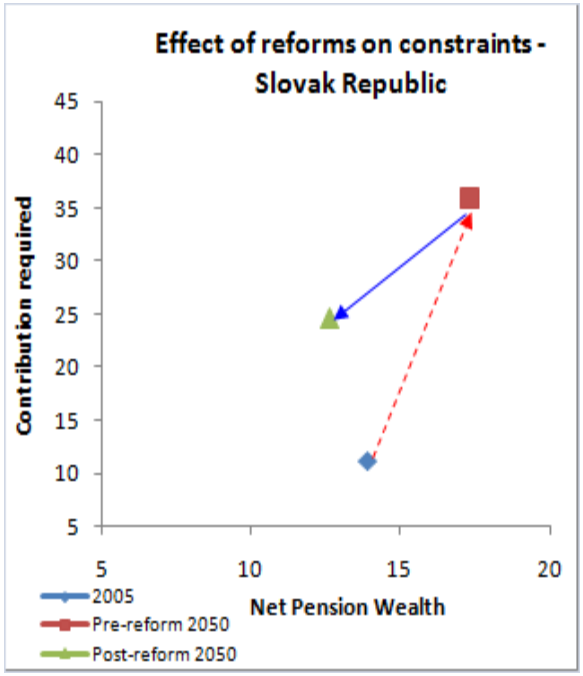


Figure 7.4: Development in social sustainability indicators- country-by-country analysis..cont

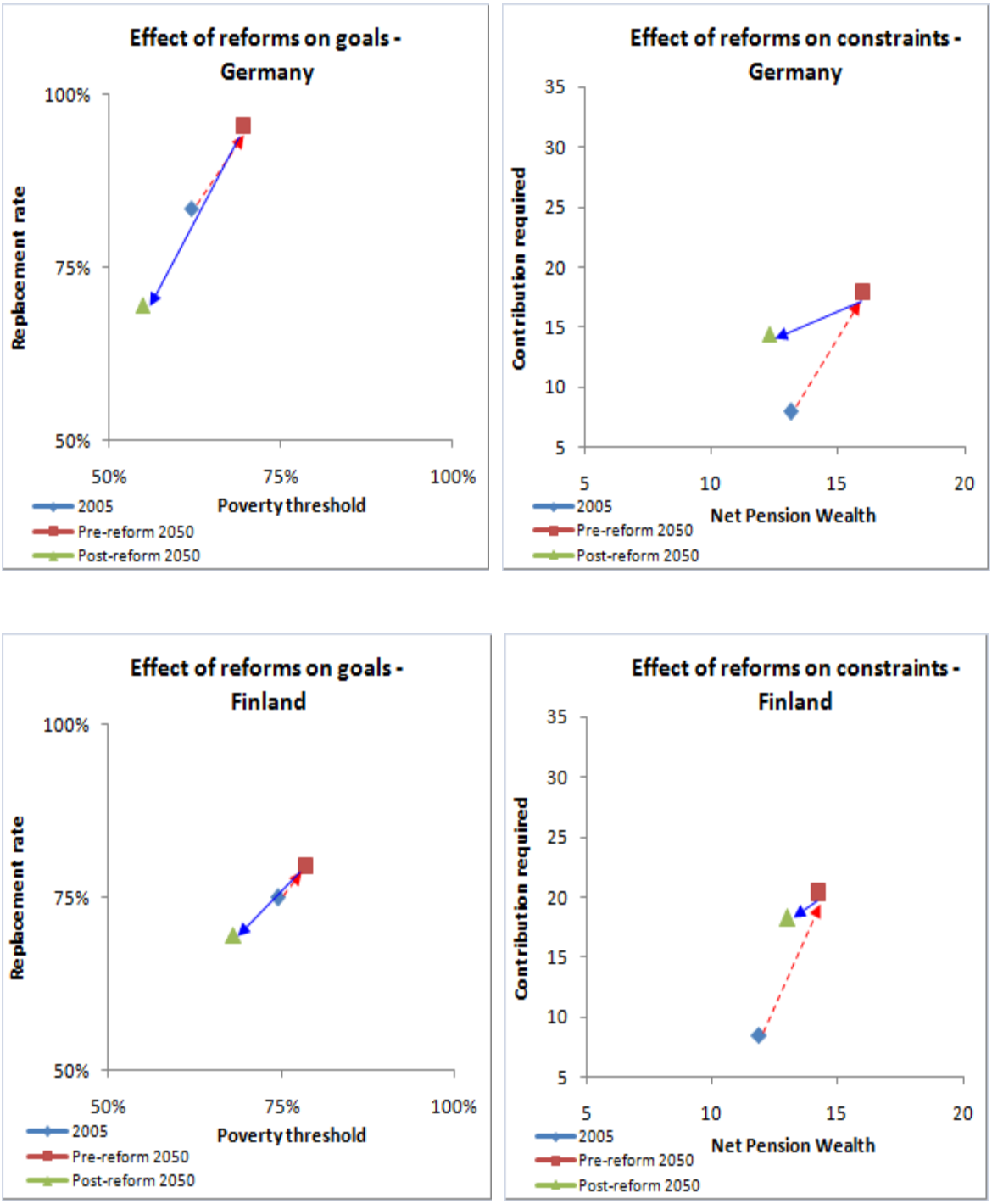
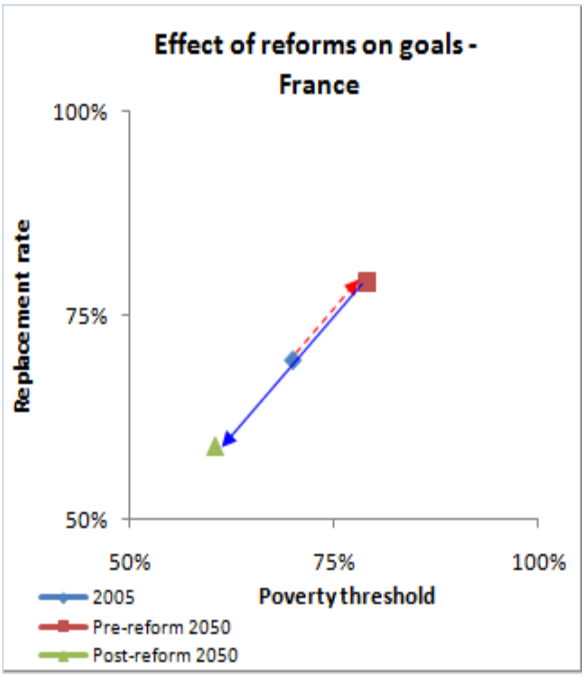
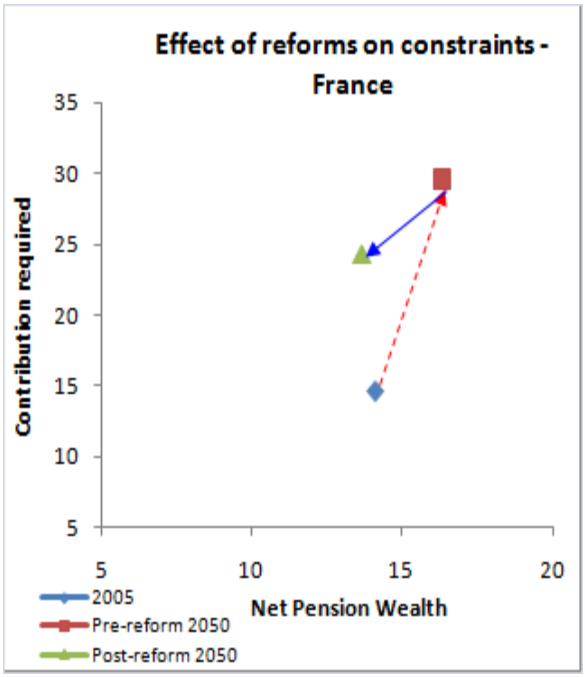
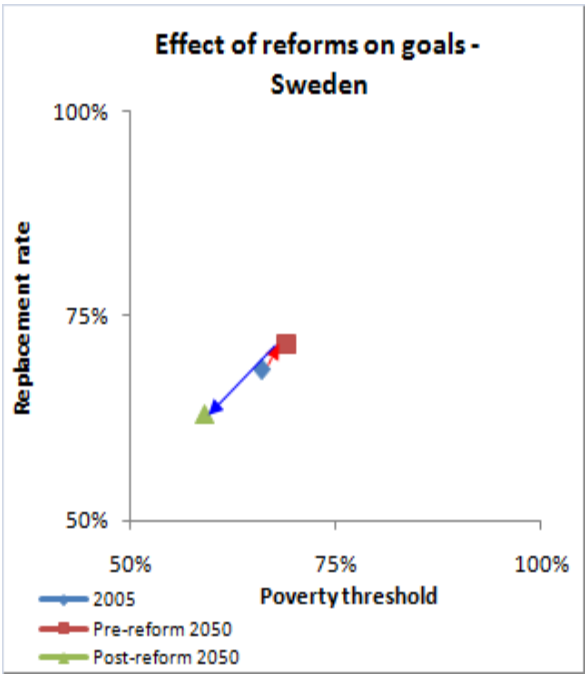


Figure 7.4: Development in social sustainability indicators- country-by-country analysis..cont







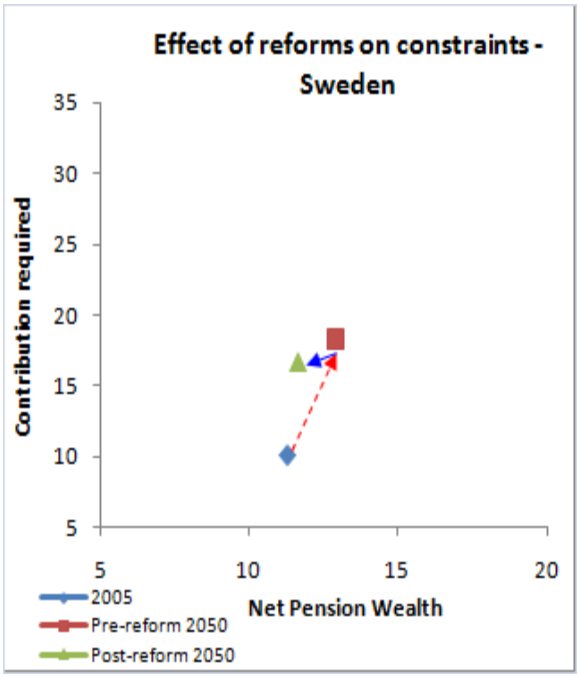
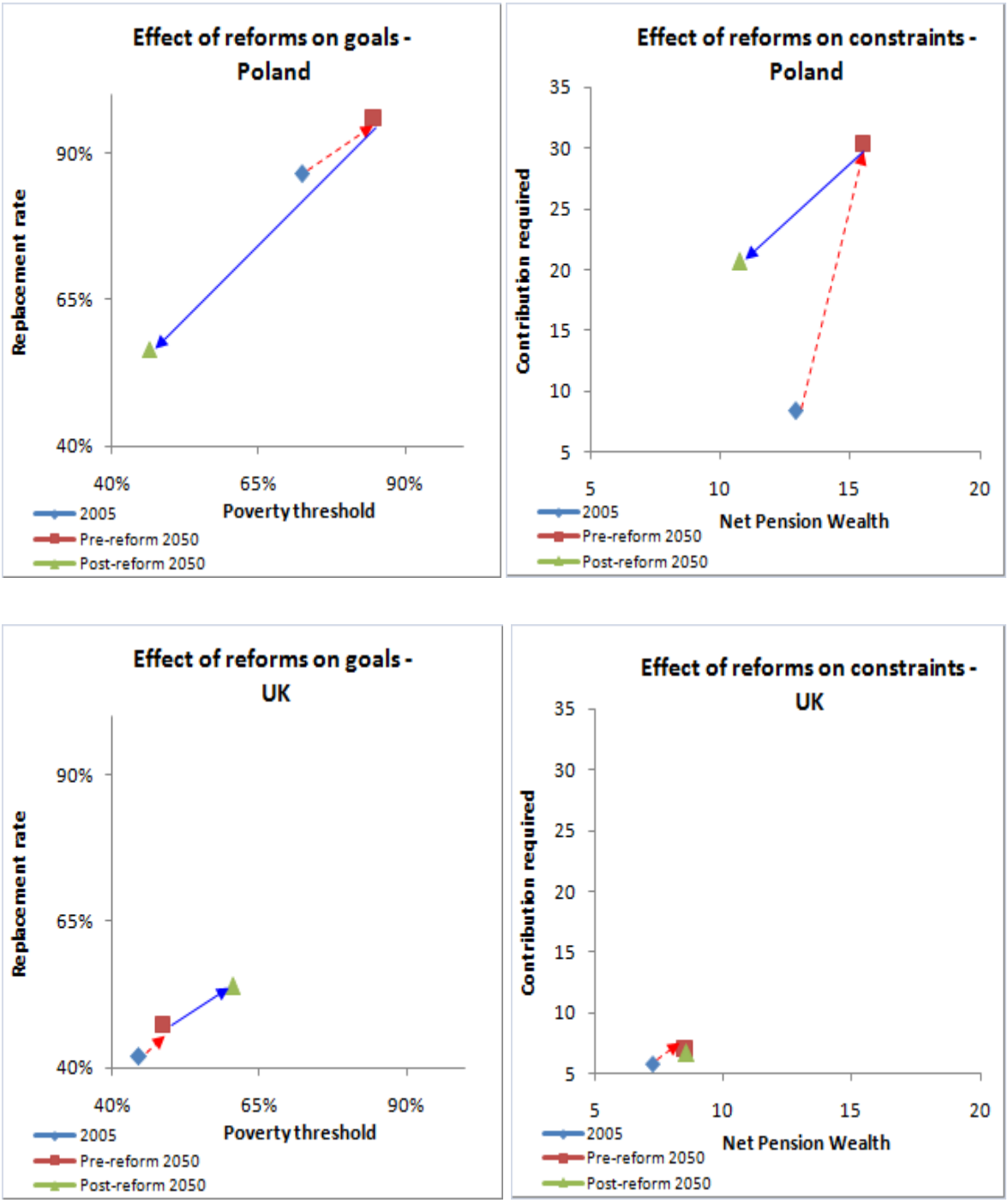


Figure 7.4: Development in social sustainability indicators- country-by-country analysis..cont



In conclusion, this analysis suggests while reforms have, in general, reduced the strength of the poverty alleviation and consumption smoothing functions, in most countries these remain significant. In Sweden, France and Germany the reforms might result in more years at-risk-of-poverty, particularly for women. In Poland and Slovakia, these concerns are much more heightened. As for consumption smoothing, the reforms seem to lead to closer convergence between countries, with a diminished state role.

The reforms have greatly reduced the required increase in the contribution rate to finance pension transfers to the 2050 pensioner cohort. In many cases, these transfers were reduced by reforms to levels closer to those of current generations. The equalisation of state pension ages, in particular, has turned to be a very useful way of defusing part of the financial impact of the retirement of the Baby Boom. Nevertheless in some countries, cuts in pension wealth appear to be high, though policymakers can argue that the decline in potential entitlement is offset by the reduced need to increase contribution rates, and is generally not at the cost of significantly reduced system goals. In some other countries, such as Slovakia and Poland, policymakers may however need to reconsider the gender impact of reforms.

7.3 Conclusion

This Chapter evaluated the social sustainability of pension reforms from a different perspective than Chapter 6. Rather than comparing the projected implications of the reformed system with those of the current system, it first looked at how longevity and the change in the size of pensioner cohorts would have affected the cost of financing the current systems as against the reformed ones. It then assumed this cost would have decreased future disposable income and estimated the social sustainability indicators for the pre-reform systems in 2050 accordingly. While Chapter 6 suggested reforms had not done enough to maintain systems fiscally sustainable, this Chapter revealed they cut substantially the potential rise in long-term contribution rates. It confirmed that in most countries, this was achieved without endangering significantly the overall goals of pension systems. In fact, some countries managed to increase generosity, while still reducing future financial needs by raising the pension age. However the Chapter corroborated the finding that the risk-of-poverty under the reformed systems has heightened in countries which reduced substantially the progressivity of their pension systems. Furthermore in many countries, the consumption smoothing function of the state pension system for middle-to-high earners has diminished in strength. The considerable cuts in anticipated pension wealth in some countries may also create intergenerational pressures.

Up to now, the analysis has focused solely on the hypothetical full-career case, which may not be very representative of actual labour market participation. This assumption will be relaxed in the next Chapter and the social sustainability framework will be applied to more realistic hypothetical cases. This should result in the indicators becoming more in line with the data presented in Chapter 1 and the typologies set out in Chapter 2. Moreover getting a better understanding of the actual performance of current pension systems should enable one to make a better assessment of the possible impacts of reforms.

PART THREE

REFINING THE SOCIAL SUSTAINABILITY ASSESSMENT FRAMEWORK

8. Adjusting social sustainability indicators to reflect incomplete full-time careers, part-time work and inactivity

The social sustainability indicators developed in Chapters 6 and 7, like the existing literature, assume economies are characterised by full-employment and complete full-time careers for both genders. This assumption, though analytically convenient, is unrealistic and is not consistent with the concepts underlying the social sustainability framework. The latter, in fact, seeks to study whether reforms result in systems failing to remain effective and therefore becoming unsustainable. However the assumption of complete working-age full-time employment may over-represent the real efficacy of a pension system, by overestimating the achievement of system goals (since individuals accrue the maximum theoretical generosity of the system) while diminishing the constraints faced (as it boosts the support ratio). Moreover, reformers may have based their policy choices in light of labour market developments which would offset part of the effects of reforms.

Lack of adequate comparable data on contribution records and the difficulty of making projections raise significant issues when moving away from the full-careers assumption. However, this Chapter will still attempt to present a more realistic estimate of the social sustainability indicators, taking into account incomplete full-time careers, part-time work and labour market inactivity. While still subject to significant caveats, the estimates presented should present a better assessment of the present and future efficacy of the analysed pension systems. The Chapter starts by describing the data used to modify the indicators. Then it shows what these imply for the achievement of system aims and pressures on constraints, compares these with the results of Chapter 6 and assesses if these new indicators bring us closer to the pension system typology of Chapter 2. Finally some estimates of the individual saving required to offset the effects of pension reforms are presented. However, it is important to underline that the results in this Chapter are not to be taken as definitive, as they are sensitive to the assumptions taken. Sensitivity tests will be presented in Chapter 9.

8.1 Developing a better understanding of the interaction of working age individuals with their pension system

Chapters 6 and 7 are based on hypothetical individuals in full-time employment throughout their career. Labour market data, however, clearly indicate that very few individuals fit this description. Moreover, data show that there are very considerable differences in labour market activity in the ten countries under question. Thus, social sustainability indicators based on this

assumption probably overestimate the efficacy of pension systems as they are based on the maximum theoretical benefit which individuals could extract from the pension system while concurrently possibly underplaying pressures on resources. Also, since countries differ in the degree to which they stray from the assumption of complete working-age full-time employment, the latter complicates cross-country analysis.

Data on the average number of years contributed by workers are not readily available on a harmonised basis. ISG (2009) includes information on the contribution years (including credits in some cases) of new flows of retirees. These data suggest that assuming the same labour participation across all countries is unrealistic and creates significant problems on a gender level within the same country. However while these data shed some light on labour market participation within countries, their reliability is dubious. In particular, the data for Eastern European countries are suspiciously high, in light of other existing labour market data.

Table 8.1: Seniority (including non contributory periods) at retirement of new retirees (years)

	Male	**Female**	**Both genders**	**Period for "full pension"**
Austria	NA	NA	NA	45
Finland	33.3	30.6	31.9	39
France	40.0	31.8	35.8	40
Germany	NA	NA	NA	No full pension
Hungary	39.9	38.0	38.8	No full pension
Italy	34.9	27.9	32.1	40
Poland	36.5	33.3	34.3	No full pension
Slovakia	40.4	34.0	35.8	No full pension
Sweden	40.0	34.0	37.0	40
UK	42.0	26.0	35.0	44 (M)/39 (F)

Source: ISG (2009), MISSOC Tables (2008).

Table 8.2 shows Eurostat's estimates of the average exit age from the labour force[163] in the ten countries. These data suggest a smaller gender gap in the contributory period and also significantly higher effective contribution periods in some countries (e.g. Italy) than the administrative data in Table 8.1. However the model used by Eurostat is not very useful for the purposes of this research, as it fails to capture the overall differences in labour market participation between countries. The model assumes, for instance, that up to the age of 49 years nobody will have left the labour force. However, participation rates at age 49 differ significantly across countries.

[163] This measure is based on a probability model considering the relative changes of activity rates from one year to another at a specific age. These activity rates are from the harmonised EU LFS.

Table 8.2: Average exit age from the labour force (average for the period 2001-2006)

	Male	**Female**	**Both genders**
Austria	60	59	60
Finland	61	61	61
France	59	59	59
Germany	61	61	61
Hungary	60	59	60
Italy	60	60	60
Poland	60	56	58
Slovakia	60	56	58
Sweden	63	63	63
UK	63	62	63

Source: Eurostat LFS.

A better approach to understand the interaction of individuals with their pension system lies in using labour market participation data. Table 8.3 presents labour market activity rates broken down by gender and by age group from Eurostat's Labour Force survey (LFS).

Table 8.3: Activity rates by age (2005)

a) Male (% in age group who are active in the labour market)

	AU	**FI**	**FR**	**DE**	**HU**	**IT**	**PL**	**SK**	**SW**	**UK**
15-19	45.1	41.8	17.5	30.2	17.3	6.4	11.5	9.4	28.2	47.3
20-24	76.7	79.1	64.8	71.4	63.3	53.3	65.0	74.5	71.5	81.5
25-29	88.1	89.9	93.5	84.0	84.2	88.4	93.0	95.4	87.0	90.8
30-34	93.8	93.9	95.7	94.5	92.8	91.5	95.8	95.9	92.8	92.8
35-39	94.3	92.5	95.2	95.9	95.5	90.4	93.9	96.6	93.0	93.1
40-44	92.5	92.0	95.8	95.8	95.6	86.4	91.5	95.1	91.1	91.7
45-49	93.0	89.6	94.2	94.2	94.2	80.8	84.2	92.1	89.8	90.2
50-54	84.3	82.8	89.8	89.9	85.3	73.5	69.6	88.2	88.7	86.3
55-59	64.3	71.4	65.8	80.3	55.9	56.0	47.9	78.5	83.8	77.4
60-64	14.7	35.1	14.8	37.8	30.6	19.2	26.2	16.6	65.3	55.6
65-69	4.7	8.5	3.9	7.2	12.0	5.5	13.2	4.1	16.3	18.3
15-69	54.4	54.4	50.5	55.0	52.5	47.8	62.1	55.2	54.3	55.6

b) Female (% in age group who are active in the labour market)

	AU	**FI**	**FR**	**DE**	**HU**	**IT**	**PL**	**SK**	**SW**	**UK**
15-19	32.2	46.3	9.9	24.6	3.5	12.7	7.8	8.5	32.4	46.7
20-24	69.0	71.6	56.9	63.9	41.9	48.8	52.5	60.8	65.1	71.4
25-29	80.5	76.5	81.4	73.8	63.6	65.5	76.1	73.7	80.7	75.7
30-34	80.5	82.0	80.1	77.0	64.3	69.7	80.7	80.3	83.6	74.4
35-39	80.4	81.8	82.0	78.9	74.1	66.9	83.9	89.3	87.1	76.1
40-44	83.1	89.5	83.8	82.0	79.9	65.4	84.4	92.5	88.2	78.9
45-49	79.1	89.9	81.7	82.1	75.7	60.1	78.3	89.9	88.3	79.8
50-54	70.6	86.8	76.0	76.6	68.9	50.7	55.1	81.1	85.4	75.9
55-59	32.6	72.7	51.7	61.3	40.2	29.8	26.8	22.6	79.0	62.6
60-64	7.4	28.9	12.4	19.5	8.9	9.1	12.9	5.0	58.0	30.1
65-69	3.1	..	2.0	4.1	2.8	3.0	7.0	..	9.1	9.9
15-69	42.2	48.0	41.5	42.6	36.0	33.1	47.4	43.5	48.4	45.2

Note: AU – Austria; FI –Finland; FR- France; DE – Germany; HU- Hungary; IT- Italy; PL – Poland; SK – Slovakia; SW – Sweden; UK – United Kingdom.

Source: Eurostat LFS.

Activity rates for men aged 25-29 to 45-49 are quite similar across all countries.[164] There are, however, very substantial differences in labour market participation in the younger and older age groups.[165] The same pattern by age can be observed among women, but there is a far greater degree of cross-country variation in female labour market participation.[166] The data in Table 8.3, thus, confirm that assuming a complete career from age 20 to pension age misrepresents typical labour market participation and also distorts gender and cross-country comparisons. They also indicate that a considerable number of people, especially women, are not economically active.

Using these activity rates, one can construct an indicator of the average labour market participation between age 20 and pension age for the whole population. For instance, if all those aged 20 to 24 were in employment, one would be justified in assuming that individuals contribute for 5 years during this period. In reality, however, an average of only 70% of individuals aged 20-24 were participating in labour market activity. Thus the average number of contribution years between ages 20-24 cannot be assumed higher than 3.5 years. Applying the same principle for all ages between 20 and pension age, one can make an estimate of the average contribution years in 2005 (see Table 8.4).

Table 8.4: Estimate of contribution years between 20 and pension age using 2005 participation rates

	Male	**Female**
Austria	35.1	28.8
Finland	36.3	34.0
France	34.7	29.7
Germany	37.2	30.8
Hungary	31.0	23.4
Italy	34.9	22.8
Poland	33.4	26.9
Slovakia	35.8	30.0
Sweden	38.2	35.8
UK	38.0	29.7

Source: Own workings using data from Eurostat LFS.

In light of the above, Table 8.5 presents our estimate of the average effective age of retirement on the basis of 2005 labour activity rates. It differs from Table 8.2 in that it does not

[164] The coefficient of variation in activity rates for these ages ranges between 2% and 5%.
[165] The coefficient of variation for ages 15-19 is 61% and that for ages 60-64 and 65-69 are more than 55%.
[166] The activity rate of women in Italy is nearly 50% less than that observed in Sweden, against 14% among males.

assume that everyone is participating in the labour market at age 50.[167] Rather, it takes into account differences in labour market participation. As a result, the difference among countries and genders within the same country becomes quite more significant than that implied by Eurostat's average exit age indicator. It is also interesting to note that while there are significant differences between the estimates in Tables 8.1 and 8.5,[168] the intra-country gender gap in contribution years is similar.

Table 8.5: Own estimate of the average effective age of retirement (2005)

	Male	**Female**
Austria	55	49
Finland	56	54
France	55	50
Germany	57	51
Hungary	51	43
Italy	55	43
Poland	53	47
Slovakia	56	50
Sweden	58	56
UK	58	50

Source: Own workings using data from Eurostat LFS.

This approach not only makes the average exit age indicator more representative of cross-country and intra-country gender differences. It also has the benefit of being based on a harmonised data source, the LFS. Moreover, since EU projections of labour market participation rates are available, it is possible to create forecasts. Using an age-cohort methodology, EPC (2009) forecasts future participation on the basis of cohort past participation and changes in the demographic structure,[169] and takes into account reforms to early retirement schemes and pension ages. Table 8.6 presents 2005 labour market participation data, by gender, and EPC (2009) projections for 2050. Participation is expected to increase substantially in nearly all countries, rising by nearly a tenth in Hungary, Italy, Austria and Germany.

[167] This explains why the estimates in Table 8.5 are all lower than those in Table 8.2 and in some cases are below age 50 (which is the starting point of Eurostat's average age of exit indicator).
[168] For instance, the number of contribution years estimated for Hungary is much lower than the data from ISG (2009).
[169] The higher participation rate among current younger women is thus maintained when they get older, while the ageing of the workforce reduces participation as participation rates declines with age.

Table 8.6: Labour market participation rate (% for 15-64), actual and projected

	2005		*2050*	
	Men	*Women*	*Men*	*Women*
Austria	79.9	64.4	81.9	73.0
Finland	76.7	72.3	80.0	78.1
France	75.4	63.3	75.2	67.7
Germany	79.5	65.4	82.9	76.5
Hungary	67.5	53.7	69.3	60.5
Italy	74.9	50.9	78.3	57.1
Poland	69.8	57.9	71.4	59.6
Slovakia	76.8	63.4	75.5	65.2
Sweden	79.4	75.6	84.2	80.5
UK	82.4	68.3	82.6	74.4

Source: EPC (2009).

On the basis of these projections,[170] the average effective age of retirement for the overall population should rise significantly in most countries. The increase among women reflects both a cohort effect – the catch-up in gender employment rates – and a policy effect – gender pension age equalisation. The change among men mostly reflects tightening of early retirement and disability schemes.

Table 8.7: Own estimate of the average effective age of retirement (2050)

	Male	**Female**
Austria	56	55
Finland	59	58
France	55	53
Germany	61	61
Hungary	52	49
Italy	57	48
Poland	55	48
Slovakia	55	51
Sweden	62	59
UK	61	57

Source: Own workings using data from Eurostat LFS and EPC (2009).

Labour market participation data are not only useful to arrive at estimates of possible contribution years – thereby modifying the expected payouts to future pensioners. They can also be used to modify the projected financial cost of the pension system. Countries differ not only in terms of expected demographic trends and legislated pension ages. The extent to

[170] Adjusted to reflect the legislated increase in pension age in Germany and the UK not considered in EPC (2009). We assumed participation for ages 65 to 68 will increase like that for ages 60 to 65.

which their working age population participates in formal labour market activity, thus creating the means to support the dependent population, also differs.

Table 8.8: Demographic dependency vis-à-vis system dependency (%)

	Pensioners to working age (2005)	*Pensioners to workers (2005)*	*Pensioners to working age (2050)*	*Pensioners to workers (2050)*	*Change in old age dependency*	*Change in system dependency*
Austria	29	41	49	63	67	56
Finland	24	32	47	60	100	88
France	35	50	61	86	76	71
Germany	27	38	50	63	85	68
Hungary	42	68	64	98	53	43
Italy	36	56	60	69	69	24
Poland	23	36	69	104	200	191
Slovakia	27	39	71	101	160	159
Sweden	27	35	43	52	58	49
UK	30	40	31	40	5	1

Source: Own analysis of Eurostat population and EPC (2009) participation projections.

Multiplying labour market participation rates by the working-age population yields the number of contributors to pension systems, both current and expected. These estimates can be used to calculate the system dependency ratio - the number of beneficiaries divided by the number of contributors. This presents a more realistic measure of the demographic ratio which a pension system faces. Given that not all of those of working age are in employment, the current dependency rate is significantly higher than the demographic dependency ratio (which tends to be the ratio most commonly used to assess pension system financial sustainability). Moreover since labour participation rates are expected to rise by 2050, the change in the system dependency ratio tends to be relatively smaller than that in demographic dependency. Nonetheless, the absolute levels of this ratio become worryingly high in many countries, with the ratio becoming very close to or over one contributor for each beneficiary in France, Hungary, Poland and Slovakia.

Another consideration that needs to be made is that a significant proportion of the employed are not in full-time employment but work part-time. This is important as part-time employees tend to earn significantly lower wages than full-timers and this may reduce their pension entitlements (see Table 8.9). Table 8.10 shows very substantial cross-country differences in the share of part-time employment.[171] Part-time employment is quite important when looking at female employment in most countries.

[171] The coefficient of variation among the part-time share of men is 49% and that among women is 57%.

Table 8.9: Hourly wage rates (in euros)

	Male		Female	
	Full-time	**Part-time**	**Full-time**	**Part-time**
Austria	13.3	12.5	10.0	9.4
Finland	14.9	12.3	12.5	10.3
France	15.1	16.9	12.6	13.2
Germany	17.1	13.3	13.4	11.4
Hungary	2.7	2.6	2.3	2.4
Italy	11.0	12.4	9.1	8.6
Poland	3.4	2.8	2.9	2.3
Slovakia	2.4	1.4	1.8	1.1
Sweden	16.0	13.4	13.9	12.4
UK	20.6	13.3	16.1	10.8

Source: Own workings from Eurostat's 2002 SES.

Table 8.10: Share of employed in part-time work in 2005 (% of total employment)

	Males	**Females**
Austria	6.1	39.3
Finland	9.2	18.6
France	5.8	30.2
Germany	7.8	43.5
Hungary	2.7	5.8
Italy	4.6	25.6
Poland	8.0	14.3
Slovakia	1.3	4.1
Sweden	11.5	39.6
UK	10.4	42.7

Source: Own workings using data from Eurostat's LFS.

To conclude, this section has indicated that:

1. A significant part of the working-age population, particularly women, is not active in the labour market. There are very significant cross-country and gender differences in the size of the non-active population. The system dependency ratio is higher than the demographic dependency ratio, but since labour market participation is projected to rise by 2050, the increase in the system dependency ratio should be relatively smaller.
2. Most of those who work full-time do not do so for the entire period between age 20 and the pension age. In no country, do contribution years, on average, reach 40 (as per ISG replacement rate assumptions). Moreover there are significant cross-country and gender differences in the number of contribution years.
3. In some countries, a very substantial part of those in employment are in part-time work and earn lower hourly wage rates than full-timers. Part-time employment is female-dominated in all countries.

8.2 Modifying the social sustainability indicators to better reflect current and projected labour market activity

The social sustainability indicators presented in Chapters 6 and 7 were based on the assumption that everyone of working age is constantly full-time employed till pension age. The data in section 8.1 show that this is not the case, particularly for women, and that the support ratio underpinning pension systems is much lower than that suggested by a simple rendering of demographic data. With this in perspective, the next step is to re-estimate all the indicators presented previously, replacing the full-career assumption by our estimates of the average effective age of retirement presented in Tables 8.5 and 8.7. Moreover we will introduce two new individuals for each gender, one working part-time and the other in receipt of the minimum pension in that particular country. The aim of the latter case is to capture the protection floor available in each country for someone with no contribution years.

To arrive at our aggregate indicators, we compute for each gender an average of the indicators for the 9 hypothetical full-timers and the hypothetical part-timer, weighted in line with their size out of the active population. This approach does not address the presence of individuals who never participate in labour market activity. Cross-national longitudinal data on this population group are not available, but there are data on the proportion of the population not currently participating in labour market activity. However we cannot use these data to proxy the importance of our hypothetical person in receipt of minimum provision, as this information was used to estimate the career length of the other cases. Nevertheless the social sustainability indicators will still be estimated and presented for this case. Also note that minimum provision comes into play if over time the entitlement of our other cases falls to this floor due to indexation depressing the relative value of pensions.

Throughout we assume that all our hypothetical individuals contribute for the same amount of years and that the age at which they retire deviates from the state pension age to that effect (see Table 8.11). This assumption raises a number of issues.

Table 8.11: Comparison of average effective age of retirement and state pension age

2005				
	Male		**Female**	
	Average effective age of retirement	**Legislated pension age**	**Average effective age of retirement**	**Legislated pension age**
Austria	55	65	49	60
Finland	56	65	54	65
France	55	60	50	60
Germany	57	65	51	65
Hungary	51	60	43	55
Italy	55	65	43	60
Poland	53	65	47	60
Slovakia	56	60	50	57
Sweden	58	65	56	65
UK	58	65	50	60
2050				
	Male		**Female**	
	Average effective age of retirement	**Legislated pension age**	**Average effective age of retirement**	**Legislated pension age**
Austria	56	65	55	65
Finland	59	65	58	65
France	55	60	53	60
Germany	61	67	61	67
Hungary	52	62	49	62
Italy	57	65	48	65
Poland	55	65	48	60
Slovakia	55	62	51	62
Sweden	62	65	59	65
UK	61	68	57	68

Source: Own workings using data from Eurostat LFS.

Firstly we are imposing the average labour market participation of a cross-section of generations on a single generation. This might overestimate the labour market participation of a generation if activity rates for different generations have been rising. Instead one would need longitudinal data which capture the real contributory period of a given generation. However these are unavailable on a harmonised basis, and furthermore no projections of the contributory periods of the generation retiring in 2050 exist. Unfortunately this issue cannot be dealt with adequately.

The second issue is that we are implicitly assuming that all our individuals display the average labour market participation trends over their career. This again presents a problem as there are well-known differences in labour market participation across the wage distribution.

Those on lower incomes tend, for instance, to have lower labour participation. Unfortunately, data limitations prevent the computation of longitudinal income-specific labour market participation trends. However in Chapter 9 we present some evidence as to how results would change if we were to assume different contributory periods for our hypothetical individuals based on socio-economic differences in labour participation.

The third issue is that in many cases, particularly in NDC systems, the generosity of a system is very dependent on career length, and thus our results are very sensitive to the assumptions made on labour market participation. Moreover in most countries, certain absences from the labour market, such as for caring, are not sanctioned by a decline in pension entitlements. To address these issues, Chapter 9 will present alternative scenarios for the career length, showing how results change when one assumes longer careers. Moreover it will also present estimates for how provisions of contribution credits affect the social sustainability indicators. A related issue is that our analysis deals with individual entitlements and ignores household formation. This could raise significant issues in some countries (more on this in Section 8.21).

Despite our new assumptions on career length, we will still be assuming the same length of time spent in receipt of state pensions as in Chapter 6 and 7. Again this assumption raises issue as in many countries individuals are able to access state pensions before state pension age. However the scope of our analysis is to study state pension systems and precludes the analysis of early retirement schemes. Similarly it is pertinent to again stress that our analysis does not take into account private retirement saving and non take-up of pension benefits.

8.21 The poverty alleviation function

The indicators presented in this Chapter have the same definitions as in Chapter 6. Net pension wealth and net pension requirement are multiples of the average wage. Thus, a system with 100% poverty alleviation would be generating net pension wealth equivalent to a cumulated annual flow in remaining life expectancy above the 60% median disposable income poverty threshold. The only difference is that the aggregate indicators – which represent the average for the considered cases – will include the part-time hypothetical case. For instance, the aggregate indicator for the poverty alleviation will be the average of the estimates for the 4 individuals with below-median wages and the part-time case, weighted in line with the respective share in total employment of full-time and part-time employment (see Table 8.10).

Table 8.12 compares the aggregate net pension wealth under the actual-careers assumption with that required to ensure an average annual income above the 60% poverty threshold. These estimates indicate that currently (except in the UK) state pension entitlements by themselves are enough, on average, for men to remain out of poverty. However in most of the countries modelled, they do not, on average, provide cumulated annual flows to keep women out of poverty throughout retirement.

*Table 8.12: The poverty alleviation function in 2005**

	Men			*Women*		
	Net Pension Wealth	*Net Pension Requirement*	*Cover (%)*	*Net Pension Wealth*	*Net Pension Requirement*	*Cover (%)*
Austria	8.1	5.1	159	8.2	7.2	114
Finland	5.3	4.9	107	5.8	6.1	95
France	6.8	6.5	105	5.5	7.6	73
Germany	5.2	5.1	102	4.8	6.0	79
Hungary	6.2	5.3	116	8.5	7.5	113
Italy	8.4	5.3	159	8.4	7.4	113
Poland	4.6	4.2	110	6.2	6.7	92
Slovakia	8.3	5.3	156	8.7	7.1	123
Sweden	6.2	5.3	116	6.2	6.2	99
UK	3.8	5.0	76	4.5	7.0	65

** These indicators are the weighted averages for 4 hypothetical actual-career full-timers with below-median wages and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.*
Source: Own analysis using APEX.

This finding contrasts sharply with that presented in Chapter 6, as can be seen in Table 8.13. While the drop for women is very apparent, the strength of the poverty alleviation function is also substantially lower for men. For instance, the estimated generosity of the pension system in Poland and Hungary, which have the lowest male labour market participation ratios, is significantly reconsidered. The generosity of the pension system in France and Germany is also a lot lower than under the full-careers assumption. By contrast, the drop in Italy, the UK, Sweden and Austria is minor. The adoption of the actual-careers assumption implies a more concentrated distribution of the overall strength of the poverty alleviation function of pensions across systems, with the gap between the most generous and less generous systems dropping significantly.[172] Its adoption also reveals a much higher gender gap in the generosity of pension systems, particularly for Italy, France and Poland.

[172] With full-careers, the gap between the poverty threshold provided in Slovakia and the UK was equal to 48 percentage points, while under the actual-careers assumption, the gap is 41 percentage points.

Table 8.13: The poverty threshold (% of median disposable income) that, on average, is covered by the pension system in 2005 under different labour market assumptions

	Male		Female	
	Full-careers assumption^	**Actual-careers assumption***	**Full-careers assumption^**	**Actual-careers assumption***
Austria	96	95	69	68
Finland	79	64	70	57
France	73	63	67	44
Germany	69	61	55	48
Hungary	79	70	73	68
Italy	99	95	79	68
Poland	77	66	68	55
Slovakia	102	93	82	74
Sweden	72	70	60	59
UK	48	46	41	39

^ These indicators are the average for the 4 hypothetical full-timer full-career workers with below-median wages.

** These indicators are the weighted averages for 4 hypothetical actual-careers full-timers with below-median wages and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.*

Source: Own analysis using APEX.

At this stage it is useful to benchmark to what extent the move to the actual-careers assumption increases the reliability of the poverty alleviation indicator. This can be tested, for instance, by looking at the degree of correlation between this indicator and Eurostat's risk-of-poverty data. As expected, there is a negative relationship between these two variables with the countries with the most generous pension alleviation cover ratio having the lowest poverty among the 65+, and vice versa. The move to actual-careers maintains the correlation coefficient between the poverty alleviation indicator and the actual risk-of-poverty rate unchanged at -0.4 with regards to men, while it rises from -0.3 to -0.5 for women. This suggests that this approach is better suited than that of Chapter 6 to capture the effectiveness of the poverty alleviation function of state pension systems, particularly as regards women.

In Chapter 6, the difference between the pre-reform and the post-reform situation was due to changing pension system rules and life expectancies. By contrast, in this Chapter we also consider labour market participation trends, which as was shown previously, with a few exceptions, should result in higher employment rates, particularly among women. Table 8.14 compares the change in achievable poverty thresholds under the full-careers and the partial-careers assumptions. Looking at levels, the poverty alleviation threshold across all countries under the actual-careers assumption is estimated at 67% for men and 52% for women in 2005, or about one-eighth the weighted average in Chapter 6. By 2050, the gap between the

indicators, however, drops to one-thirteenth, as under the actual-careers assumption the strength of the poverty alleviation function improves slightly for women, and declines by less among men than under the full-careers scenario.

Table 8.14: The poverty thresholds (% of median disposable income) achievable in 2005 and 2050 under different labour market assumptions
*a) Full-careers assumption^*

	Male			Female		
	2005	**2050**	**Change in p.p.**	**2005**	**2050**	**Change in p.p.**
Austria	96	85	-11	69	70	+1
Finland	79	72	-7	70	64	-6
France	73	62	-11	67	59	-8
Germany	69	58	-11	55	52	-3
Hungary	79	82	+3	73	79	+6
Italy	99	78	-21	79	71	-8
Poland	77	54	-23	68	39	-29
Slovakia	102	77	-25	82	62	-20
Sweden	72	64	-8	60	54	-6
UK	48	61	+13	41	60	+19

*b) Actual-careers assumption**

	Male			Female		
	2005	**2050**	**Change in p.p.**	**2005**	**2050**	**Change in p.p.**
Austria	95	74	-21	68	61	-7
Finland	64	66	+2	57	58	+1
France	63	59	-4	44	59	+15
Germany	61	59	-2	48	56	+8
Hungary	70	65	-5	68	59	-9
Italy	95	68	-27	68	50	-18
Poland	66	50	-16	55	35	-20
Slovakia	93	51	-42	74	41	-33
Sweden	70	65	-5	59	56	-3
UK	46	59	+13	39	56	+17

^ These indicators are the average for the 4 hypothetical full-timer full-career workers with below-median wages.
** These indicators are the weighted averages for 4 hypothetical actual-careers full-timers with below-median wages and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.*
Source: Own analysis using APEX.

Whereas Chapter 6 had implied that the poverty alleviation function in 2050 will be significantly below that in 2005 (except in Hungary and the UK), the trend presented in Table 8.14 is less clear-cut. In fact, out of the twenty cases (men and women in the 10 countries); there is a projected drop of more than 5 percentage points in 9 cases, as against 14 cases under

the full-careers assumption. Excluding the UK, where the strengthening of the poverty alleviation function is due to increased generosity, in the remaining 4 cases where there is a projected improvement, this reflects the influence of higher labour participation more than offsetting the less generous pension rules. In particular, higher labour market participation should strengthen the poverty alleviation function for German and French women. Similarly rising employment rates should result in women in Austria and Italy facing a much less pronounced decline in the poverty alleviation function compared to men in these countries. In contrast, in Poland and Hungary, the drop for women is much sharper than that for men, as reforms have strengthened the link between contributions and benefits.

These results are particularly interesting as they reveal that labour market participation can play a large role in modifying the impact of pension reforms. For instance, in Chapter 6, Hungary had appeared as a country where reforms were going to further increase the already generous existing system. However, taking into account actual and projected labour market participation, the estimates in Table 8.14 suggest that the generosity of the Hungarian system might actually decline over the coming years. In some countries, reforms have placed a much higher penalty on periods spent away from the labour market.[173] As a result, longer working lives can act as a countervailing force against less generous pension rules. While Chapter 6 had projected a quite dramatic rise in the poverty risk for French women, the above estimates suggest significantly improved prospects for them.

While overall generosity has been reduced, minimum pensions have not been cut and in some cases, there have been major increases.[174] This can be seen from Figure 8.1 which depicts the poverty thresholds achieved by pension systems in 2005 and 2050 for the 9 hypothetical individuals working full-time, the hypothetical individual working part-time and the person depending on minimum pensions. The countries are divided into the 3 different groups of pension systems developed in Chapter 2. The first thing that can be noticed is that in many countries, pension systems are substantially earnings-related. Recent reforms have increased this in some countries. For instance, in Poland and Slovakia, reforms have decreased progressiveness greatly, increasing the link between contributions and benefits. In both these countries reforms will impact heavily on those on lower incomes, with those at the bottom deciles falling at-risk-of-poverty. Moreover the move to NDC appears to have hit negatively women in Poland as they still may retire at 60, and this reduces their notional accumulation.

[173] This aspect will be analysed in more detail in Chapter 9.
[174] One should note that our modelling is on the basis of single individuals and ignores household formation. Many women would accrue derived pension rights. Furthermore these figures do not consider contribution credits. The latter issue will be addressed in Chapter 9.

Figure 8.1: Poverty alleviation function – the poverty thresholds (% of median disposable income) achieved by pension systems in 2005 and 2050: Actual-careers assumption

Group A: Countries with high replacement and low poverty

Figure 8.1: Poverty alleviation function – the poverty thresholds (% of median disposable income) achieved by pension systems in 2005 and 2050: Actual-careers assumption ..cont…

Group A: Countries with high replacement and low poverty

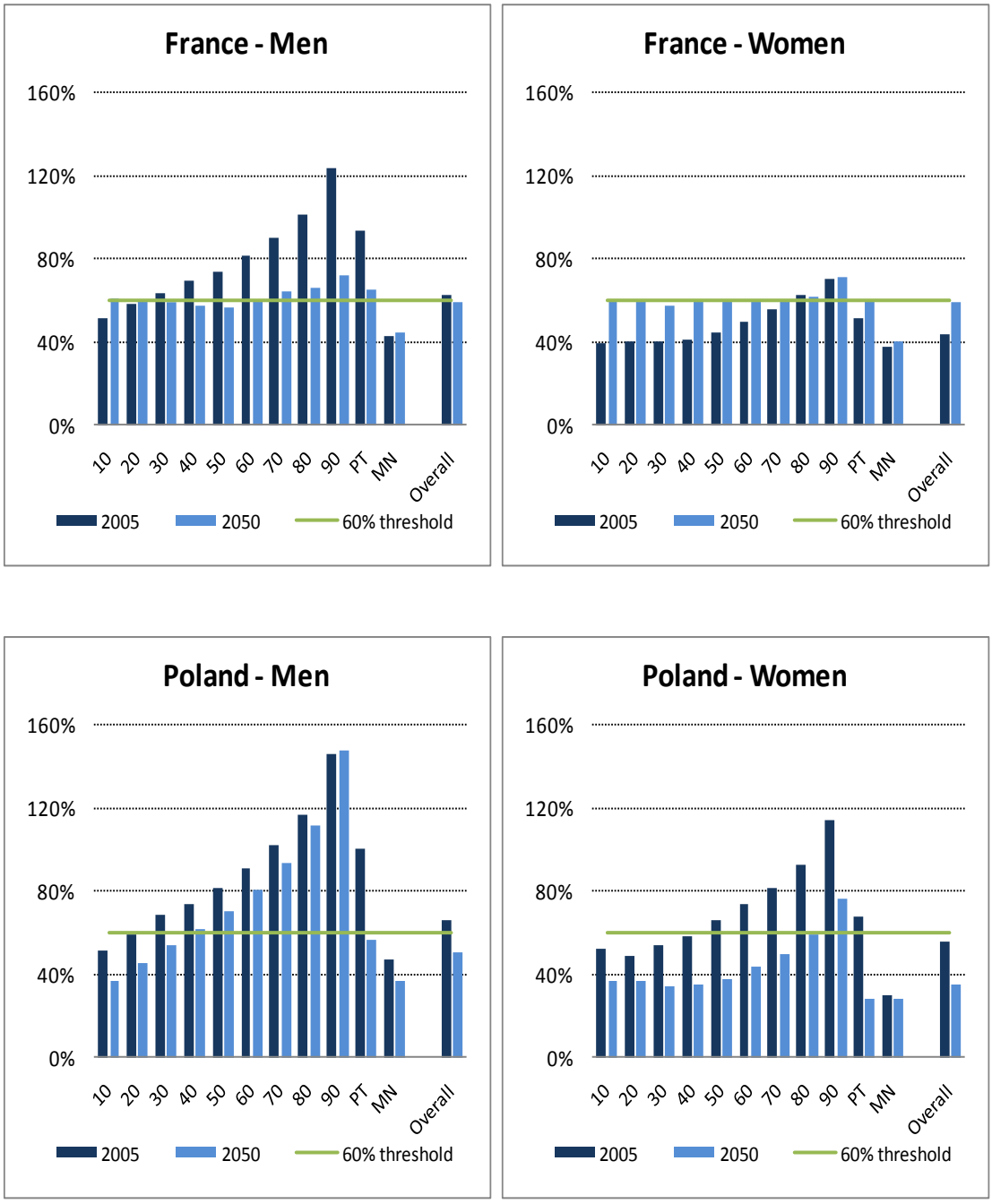
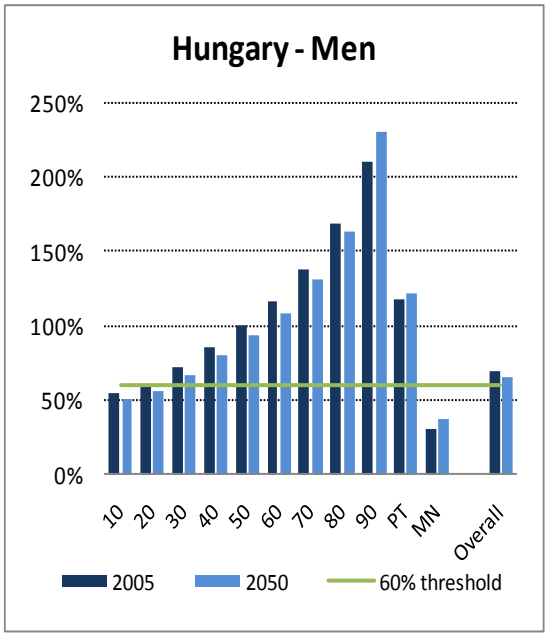
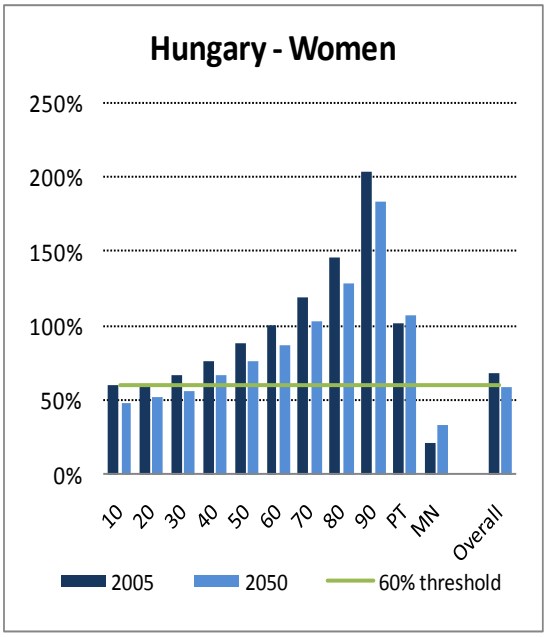


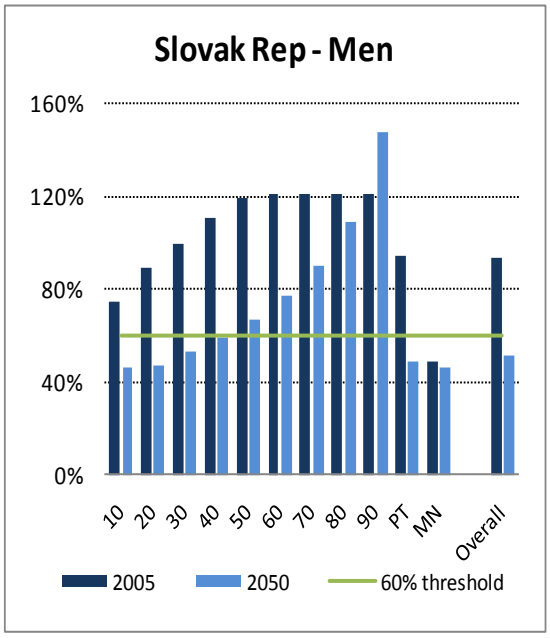
Figure 8.1: Poverty alleviation function – the poverty thresholds (% of median disposable income) achieved by pension systems in 2005 and 2050: Actual-careers assumption ..cont…

Group A: Countries with high replacement and low poverty





Group C: Countries with low replacement and low poverty



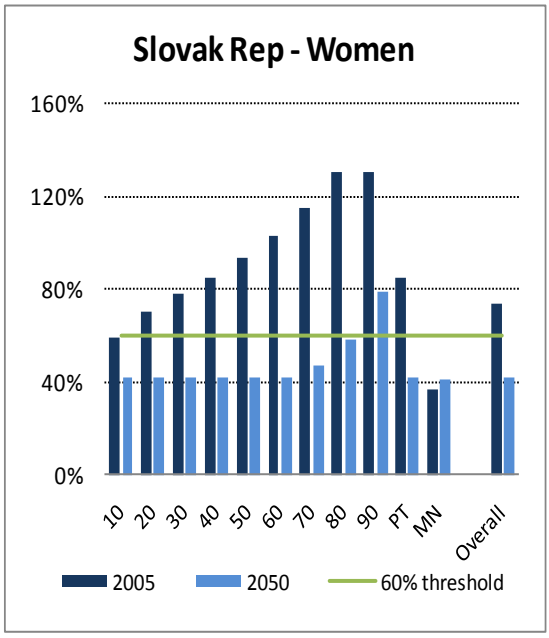
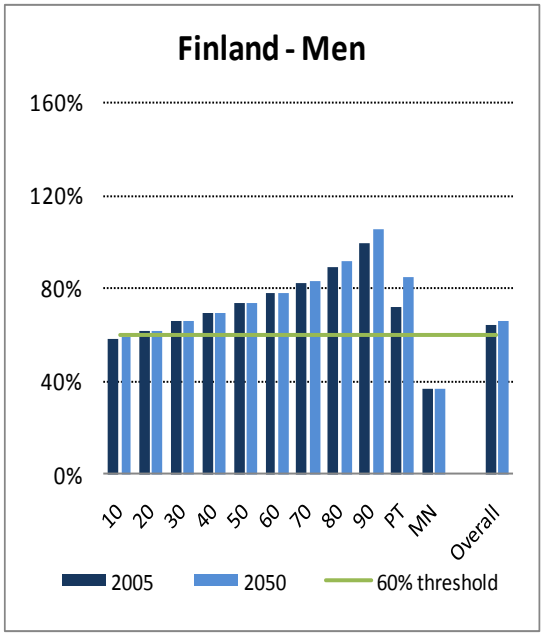
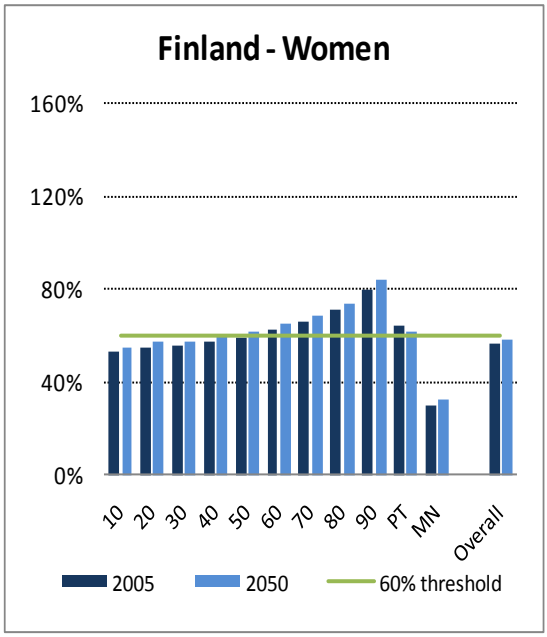
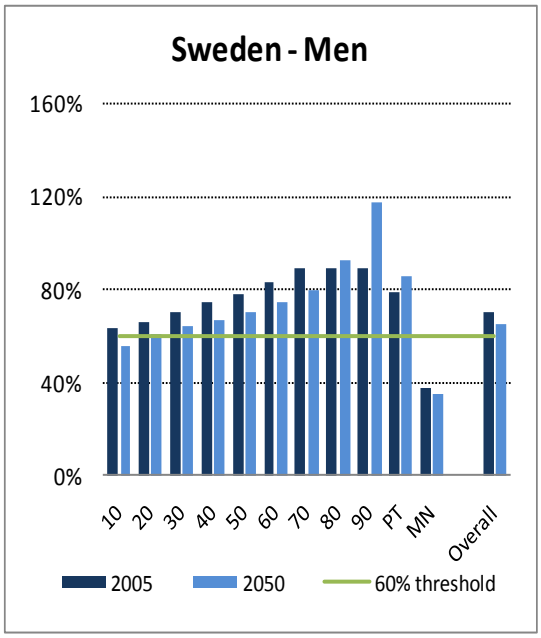


Figure 8.1: Poverty alleviation function – the poverty thresholds (% of median disposable income) achieved by pension systems in 2005 and 2050: Actual-careers assumption ..cont…

Group C: Countries with low replacement and low poverty







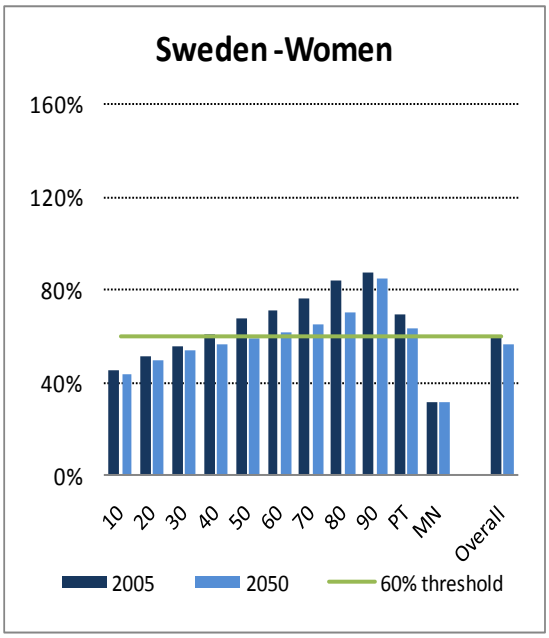


Figure 8.1: Poverty alleviation function – the poverty thresholds (% of median disposable income) achieved by pension systems in 2005 and 2050: Actual-careers assumption ..cont…

Group B: Countries with low replacement and high poverty

In the majority of countries, those at the bottom deciles appear to lose significantly less than those on median-or-higher wages. There are similar trends for part-time workers, though in some cases they face a sharper reduction than that registered for the average full-time employee. However it should be noted that the position in the wage distribution of the modelled hypothetical part-time worker differs across countries. For instance the male part-time worker in Germany and France earn more than median wages, while the female part-time workers in the UK and Slovakia are closer to those at the second-from-bottom decile.

Figure 8.1shows that minimum pensions in all ten countries do not currently keep individuals out of poverty throughout retirement. At the point of retirement, minimum pensions in some countries, like Poland and France, are currently higher than the poverty threshold, but due to price indexation their value falls rapidly during retirement, especially for women. Reforms have reduced the point-of-retirement generosity of minimum pensions only in Poland, but there has been a significant boost in the UK, Hungary, Germany and France (in that order of magnitude). Thus in 2050, the starting-point generosity of minimum pensions will be, on average, better than it is at present. Moreover, in 5 countries the equalisation of state pension ages will ensure that the period spent by women in retirement will be the same or less than it is at present. This will help reduce the gender gap in poverty risk, which will remain, however, high.

Having seen how the overall strength of the poverty alleviation function varies across the different hypothetical individuals, we can now consider the year-on-year strength. As explained in Chapter 6, different indexation rules can have a serious impact on the extent to which pensions remain above the poverty threshold throughout retirement. Table 8.15 shows an index of the risk-of-poverty for the entire population[175] and for full-timers in the bottom half of the full-time wage distribution, part-timers and those on minimum pensions. The index of the risk-of-poverty captures both the extent of retirement spent at-risk-of-poverty and the extent to which pension transfers differ each year from the poverty threshold.

[175] The different hypothetical individuals are weighted according to their share of the working age population.

Table 8.15: Projected proportion of retirement at risk-of-poverty and depth of poverty

a) Men

	10th to 50th wage deciles, Minimum, Part-time						*All*	
	% of retirement at-risk-of-poverty		*Depth of risk-of-poverty (%)*		*Index of risk-of-poverty**		*Index of risk-of-poverty**	
	Pre-reform	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*
Austria	20	20	6	7	1.3	1.4	1.3	0.5
Finland	45	33	13	10	6.1	3.5	4.1	2.9
France	55	66	12	15	6.6	9.9	4.2	6.1
Germany	52	55	13	13	6.6	7.1	3.7	3.8
Hungary	51	57	18	16	9.3	9.0	7.4	6.8
Italy	25	25	11	11	2.7	2.6	2.7	2.6
Poland	54	85	11	26	6.0	22.0	4.3	12.9
Slovakia	23	62	5	13	1.1	7.9	1.1	4.4
Sweden	24	43	3	11	0.6	4.6	1.1	3.3
UK	100	92	26	5	25.9	5.0	18.6	2.8

b) Women

	10th to 50th wage deciles, Minimum, Part-time						*All*	
	% of retirement at-risk-of-poverty		*Depth of risk-of-poverty (%)*		*Index of risk-of-poverty**		*Index of risk-of-poverty**	
	Pre-reform	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*
Austria	47	59	21	17	9.9	10.2	8.5	7.8
Finland	69	71	22	17	15.1	11.9	11.2	8.0
France	100	67	35	22	34.7	14.9	27.5	13.1
Germany	98	72	27	20	26.6	14.4	21.4	12.7
Hungary	58	77	34	26	19.7	20.2	17.4	15.4
Italy	58	81	32	30	18.4	24.1	16.9	19.0
Poland	81	100	34	48	27.2	47.6	19.6	36.4
Slovakia	52	100	26	35	13.5	35.5	10.0	23.1
Sweden	39	66	14	18	5.3	12.1	4.2	7.7
UK	97	100	43	13	41.4	12.8	39.9	11.3

** An index value of 100 implies that all those concerned are always without any income during retirement, whereas an index value of 0 implies that no one of those concerned ever spends a year in retirement with an income below the poverty threshold.*

Note: The proportion of retirement at-risk-of-poverty is estimated by summing up the total number of years during which the pension value would be below the poverty threshold for the hypothetical individuals, and then expressing as a % of the total number of years spent in retirement. The depth of risk-of-poverty is estimated by summing for those years at-risk-of-poverty for the hypothetical individuals the difference between the pension level and the poverty threshold, and then expressing it as a % of the poverty threshold for those years.

Source: Own analysis of APEX results.

It is interesting to note that there are several differing trends in these data. The most striking development is that for the UK where the risk-of-poverty is projected to decline substantially – so that it passes from the country with the highest risk to one of the countries with the lowest risk (at par with the Scandinavian countries). Similarly there is a significant improvement in the prospects for women in France and in Germany. By contrast there is a substantial increase in the risk-of-poverty in Poland and Slovakia as regards women. However, in general, it appears that the increase in labour market participation, together with the strengthening of minimum income pensions, should result in a considerable narrowing of the gap in poverty rates among elderly men and women. Italian, and to a lesser extent Swedish, women are an exception. This probably reflects the fact that the new NDC systems have introduced a more pronounced link between benefits and contributions (and hence increased the importance of having credits for periods spent caring or unemployed). As regards men, aside from the significant improvement in the UK, the only major development is the notable rise in the risk-of-poverty for low-income Polish men.

Table 8.16 compares the index of the risk-of-poverty for the entire population under the different labour market assumptions. It is evident that the move towards an actual-career hypothesis makes this index more realistic.[176] In Chapter 6, for instance, in the pre-reform case there was male pensioner poverty in only 4 countries, whereas now there is male pensioner poverty in all countries – as is the case in reality. More crucially, under the actual-careers scenario there is a very pronounced gender gap in poverty rates, which was much less evident in the full-career case. However the gender gap implied by this measure is much higher than that observed in actual data. This can be traced down to the absence of marital status considerations in our modelling. By considering everyone as being single, we overestimate the resources available to men and underestimate those of women. Against that, minimum pension rates for singles tend to be much more generous than those for couples. So while we are underestimating the risk-of-poverty for those couples on the minimum pension, we are overestimating that for couples, where only one partner has worked or where individuals were on different incomes. A priori, the latter effect would seem to be the most significant.

[176] In terms of correlation coefficients, though, the move to actual-careers makes little difference, as there already was a strong correlation (0.65) between the index of the risk-of-poverty and the proportion of the 65+ population at-risk-of-poverty.

*Table 8.16: The index of the risk-of-poverty under different labour market assumptions for the entire population**

	Male				*Female*			
	Full-career		*Actual-career*		*Full-career*		*Actual-career*	
	Pre-reform	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*
Austria	0.0	0.0	1.3	0.5	0.7	0.7	8.5	7.8
Finland	0.0	0.0	4.1	2.9	0.0	0.3	11.2	8.0
France	0.5	2.5	4.2	6.1	1.0	3.1	27.5	13.1
Germany	1.4	3.4	3.7	3.8	5.1	6.0	21.4	12.7
Hungary	0.0	0.0	7.4	6.8	0.2	0.0	17.4	15.4
Italy	0.0	0.0	2.7	2.6	0.0	0.2	16.9	19.0
Poland	0.0	6.9	4.3	12.9	0.6	19.5	19.6	36.4
Slovakia	0.0	0.2	1.1	4.4	0.4	2.3	10.0	23.1
Sweden	0.2	0.8	1.1	3.3	3.0	5.4	4.2	7.7
UK	11.1	0.6	18.6	2.8	22.9	0.5	39.9	11.3

** See note to Table 8.15*
Source: Own analysis of APEX results.

8.22 The consumption smoothing function

After having refined the analysis on poverty alleviation, we can turn to consider the impact of labour market participation on the strength of the consumption smoothing function. Table 8.17 compares the replacement rate that pension systems provide to the average individual under the full-careers and the actual-careers assumption. Similarly to what observed for the poverty alleviation function, the move to actual-careers generally results in an overall reduction in the levels of the consumption smoothing provided by net pension wealth at retirement in 2005.

The estimates in Table 8.17 also show that while in future in most cases state pension systems will provide lower replacement ratios to men, the same cannot be said vis-à-vis women. Higher labour participation, combined with more generous provisions for those on lower incomes, should increase the consumption smoothing role of state pensions for women in Germany, France and especially the UK. By contrast, the trend for men is generally negative, and in some cases more so than under the full-careers assumption.[177] Another interesting finding is that the trend in the consumption smoothing function in most cases mirrors that in poverty alleviation. However there are exceptions – most notably Poland and Slovakia where the drop in poverty alleviation is much higher, as the reformed pension systems are less redistributive.

[177] Hungary, Sweden, Italy and Austria.

Table 8.17: The consumption smoothing function in 2005 and 2050 under different labour market assumptions (average replacement ratios provided by pension system)
*a) Full-careers assumption^*

	Male			Female		
	2005 (%)	**2050 (%)**	**Change in p.p.**	**2005 (%)**	**2050 (%)**	**Change in p.p.**
Austria	91	78	-13	83	82	-1
Finland	75	69	-6	75	70	-5
France	68	57	-11	71	61	-10
Germany	85	68	-17	82	71	-11
Hungary	85	90	+5	83	90	+7
Italy	92	72	-20	82	73	-9
Poland	87	63	-24	86	50	-36
Slovakia	72	67	-5	83	67	-16
Sweden	66	62	-4	71	64	-7
UK	40	48	+8	44	60	+16

*b) Actual-careers assumption**

	Male			Female		
	2005 (%)	**2050 (%)**	**Change in p.p.**	**2005 (%)**	**2050 (%)**	**Change in p.p.**
Austria	89	66	-23	75	66	-9
Finland	59	59	0	58	60	+2
France	56	58	+2	41	51	+10
Germany	71	69	-2	59	67	+8
Hungary	74	62	-12	74	64	-10
Italy	92	67	-33	65	50	-15
Poland	67	56	-11	65	43	-22
Slovakia	62	56	-6	75	56	-19
Sweden	66	59	-7	66	57	-9
UK	37	53	+16	40	57	+17

^ These indicators are the averages for the 9 hypothetical full-timer full-career workers.
** These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.*
Source: Own analysis using APEX.

This can be seen better in Figure 8.2, which shows replacement ratios achievable pre- and post- reform for our hypothetical individuals, including those on minimum pensions[178]. This Figure reveals three main patterns. In some countries, such as the UK and France, replacement rates fall the higher one is in the wage distribution, reflecting progressive benefit formulae. The second pattern, found in countries like Italy and Austria involves constant or

[178] The pre-retirement income of those on minimum pensions was taken from EU-SILC as the median income of working age persons not in employment.

near-constant replacement rates. The third pattern, evident in countries like Hungary, Germany (pre-reform) and Slovakia (post-reform), has replacement rates increasing in line with income.

Figure 8.2: Consumption smoothing function – the replacement ratios (% of own wage) achieved by pension systems pre- and post-reform: Actual-careers assumption

Group A: Countries with high replacement and low poverty

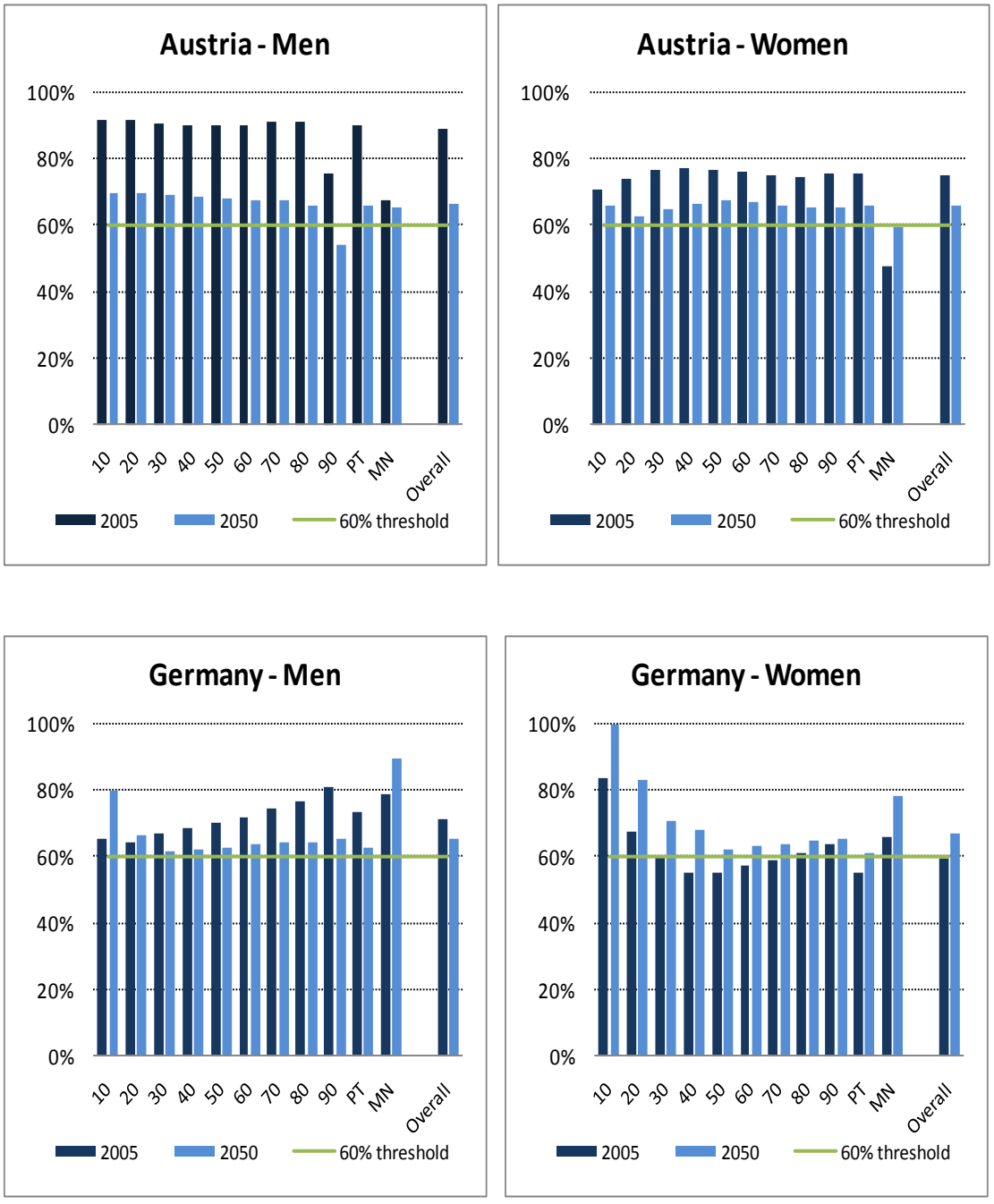


Figure 8.2: Consumption smoothing function – the replacement ratios (% of own wage) achieved by pension systems pre- and post-reform: Actual-careers assumption

Group A: Countries with high replacement and low poverty

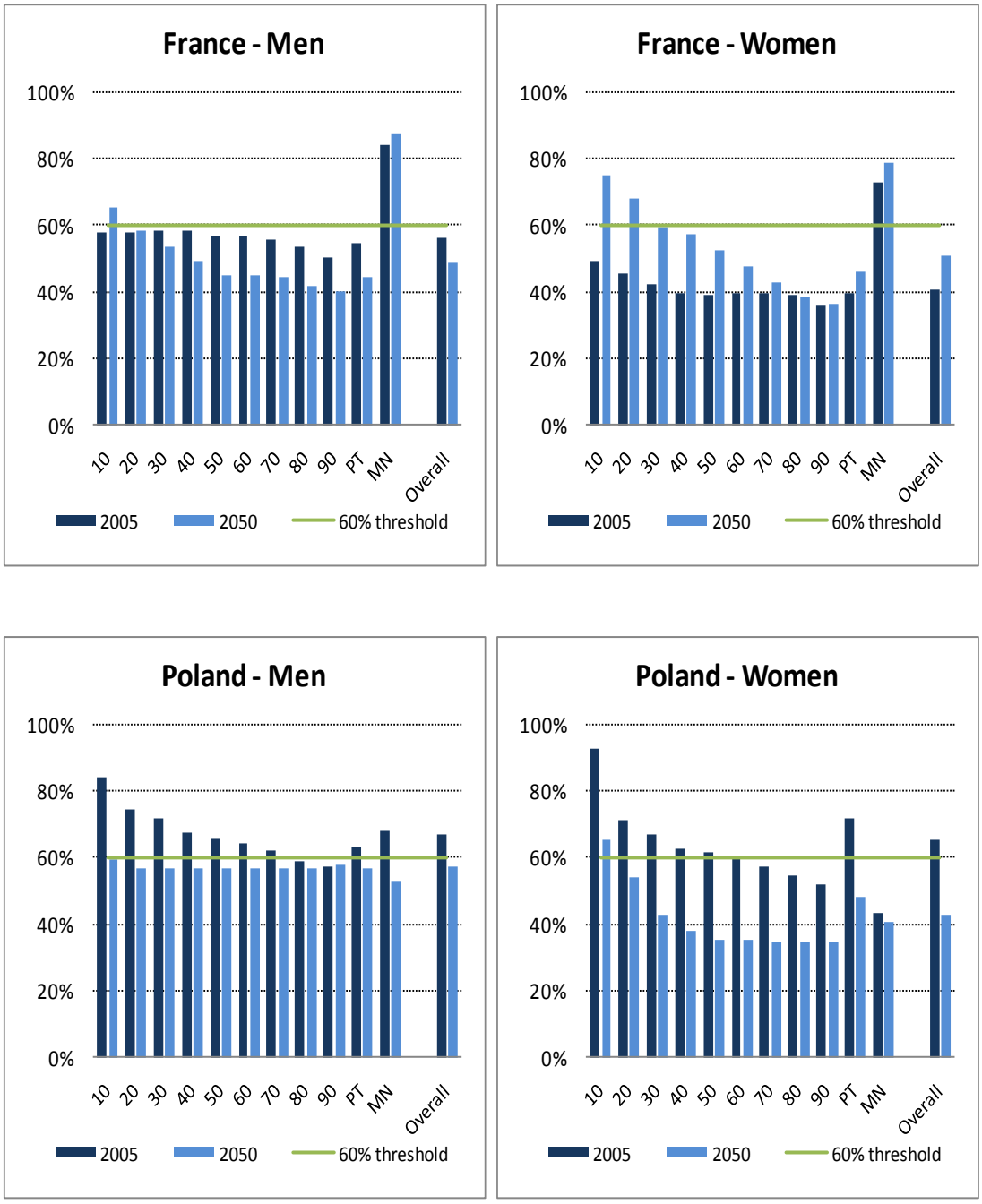
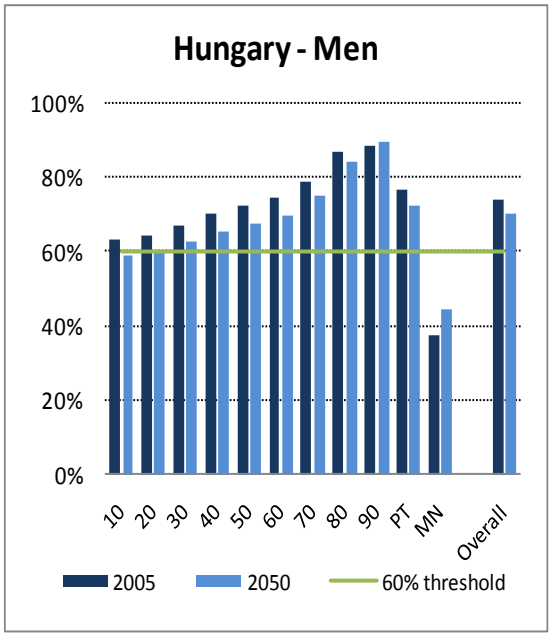
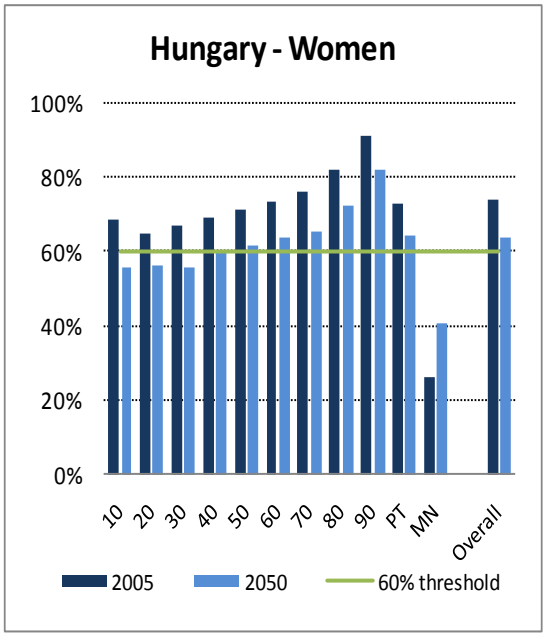


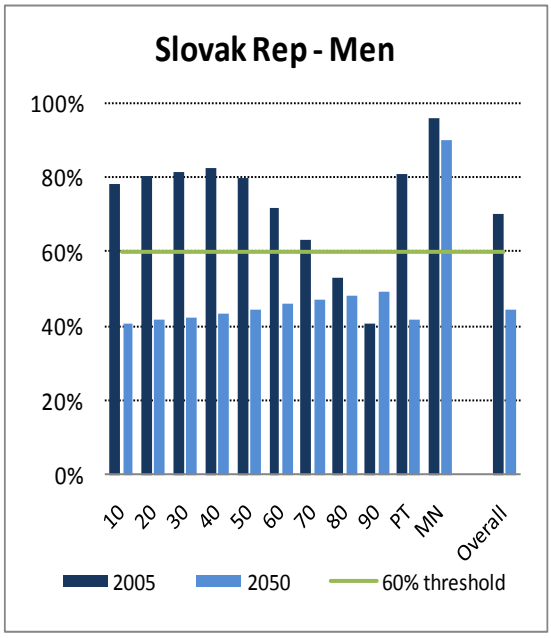
Figure 8.2: Consumption smoothing function – the replacement ratios (% of own wage) achieved by pension systems pre- and post-reform: Actual-careers assumption

Group A: Countries with high replacement and low poverty





Group C: Countries with low replacement and low poverty



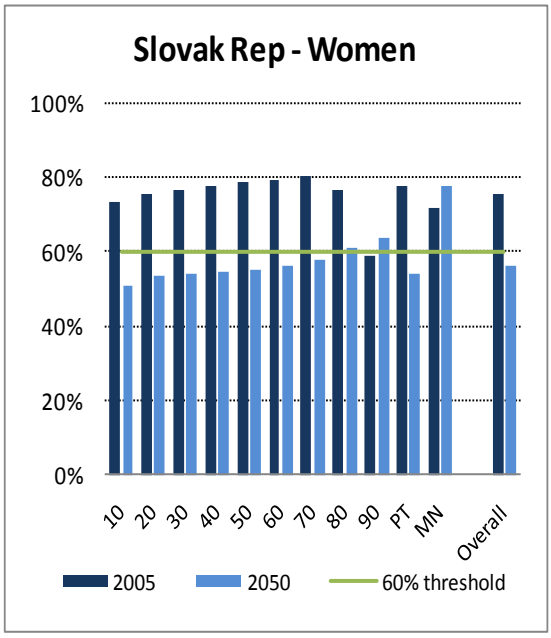


Figure 8.2: Consumption smoothing function – the replacement ratios (% of own wage) achieved by pension systems pre- and post-reform: Actual-careers assumption

Group C: Countries with low replacement and low poverty

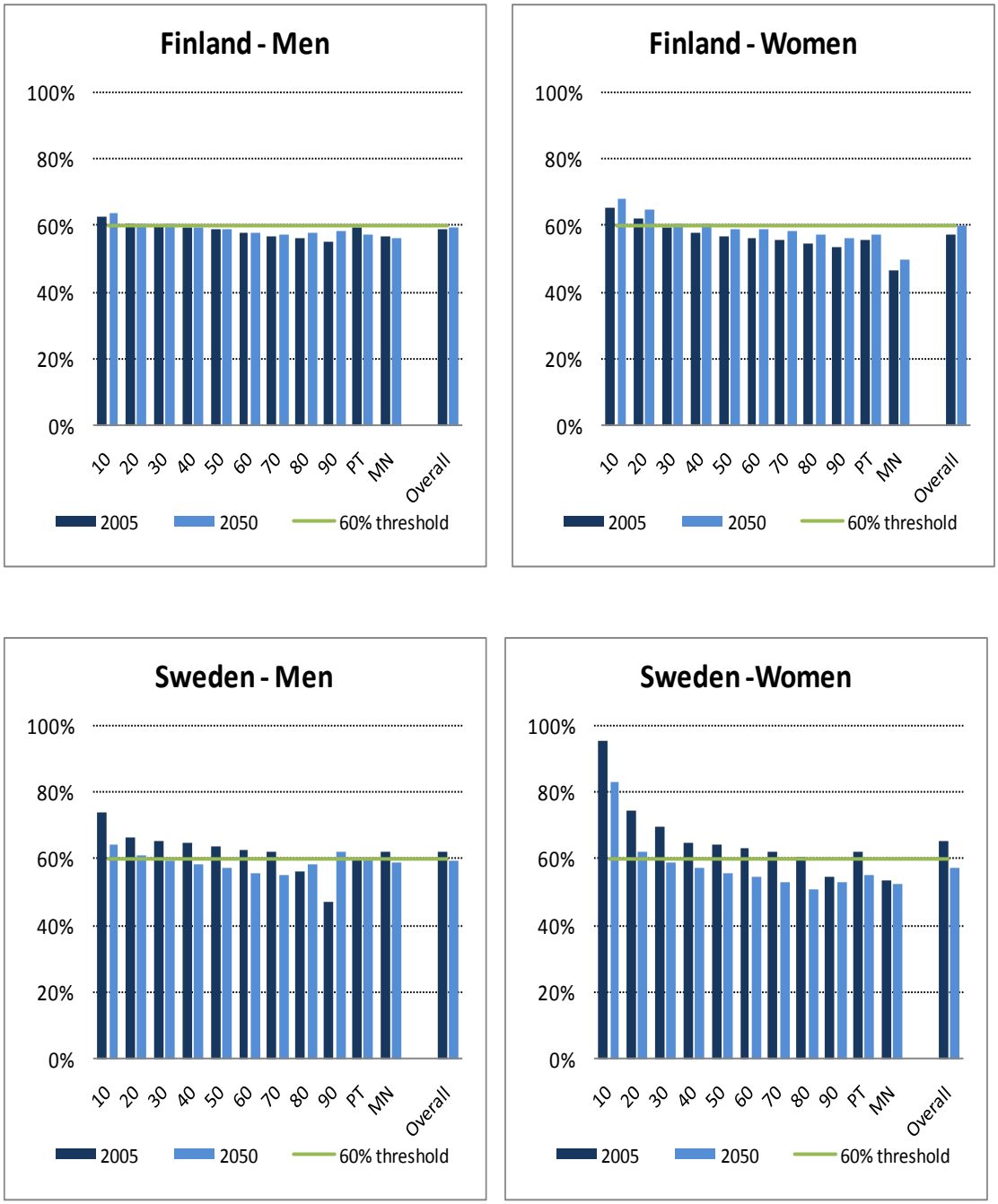
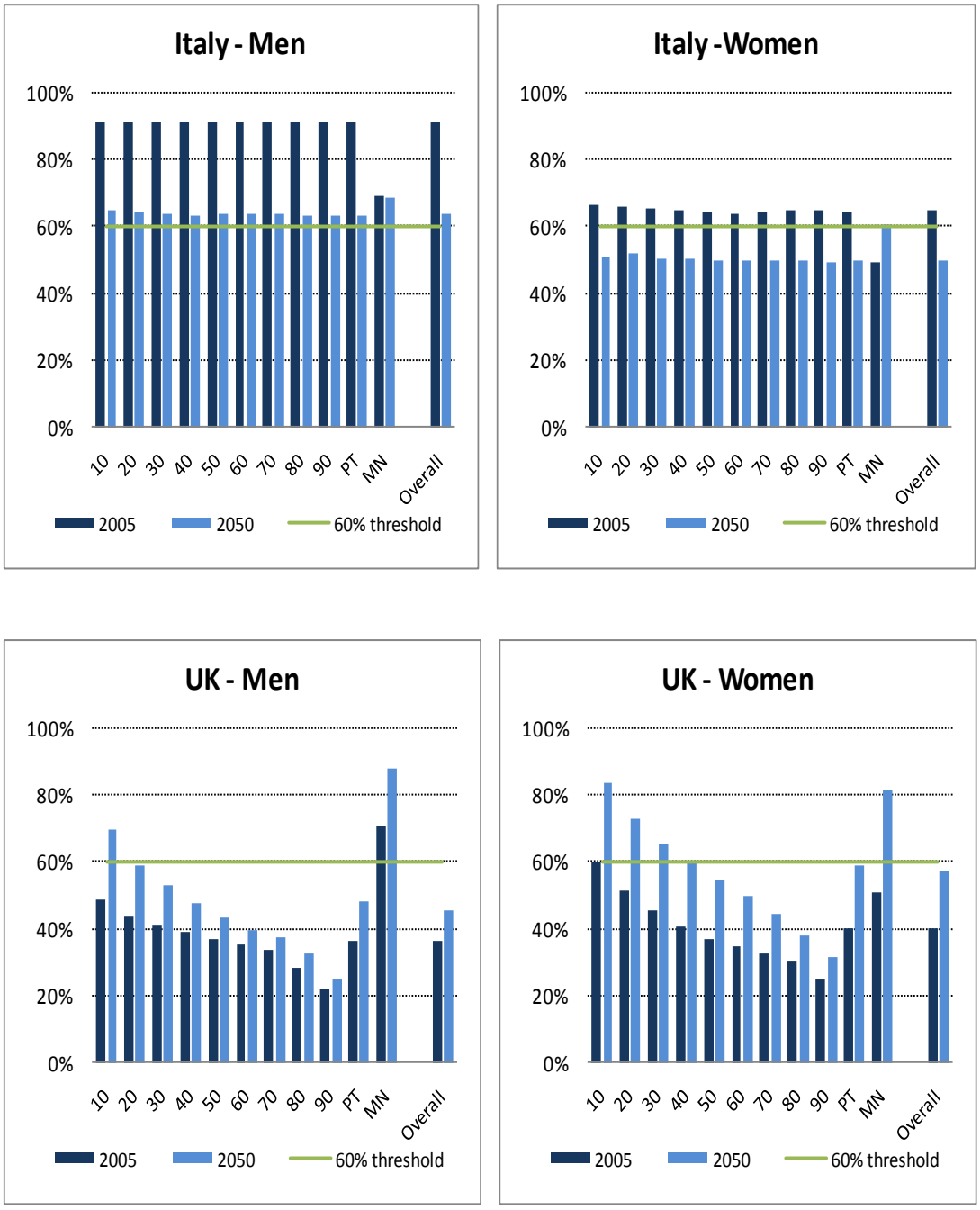


Figure 8.2: Consumption smoothing function – the replacement ratios (% of own wage) achieved by pension systems pre- and post-reform: Actual-careers assumption

Group B: Countries with low replacement and high poverty



Interestingly Figure 8.2 shows that there have been significant changes as a result of the reforms. For instance, Germany has moved from pattern three to pattern two. Slovakia, on the other hand, moved towards pattern three from being a hybrid between patterns one and

two. Poland shifted from a very progressive structure to a constant or near-constant replacement rate structure, though there still is an element of progressiveness for women at the bottom wage deciles. France and the UK, both, significantly enhanced the progressiveness of their pension system. An interesting change appears to have occurred in Sweden, which pre-reform was significantly progressive. Post-reform the downward sloping pattern has changed into something of a U-shape with those at the bottom and top wage deciles having similar overall replacement rates. This reflects on the one hand the strong minimum pension in the Swedish system, and the positive incentives offered to high income individuals by the NDC and DC elements of the new pension system. It is interesting to note that something similar occurs for Poland, where those on higher incomes are the only category with stronger consumption smoothing.

Turning to Germany, we see that the system will become more redistributive and that the relative position of those on lower incomes, particularly women, should strengthen considerably. The same can be said for the UK and France. Changing labour market participation and the reforms will make the system much better for women and for those on low incomes. Chapter 6 had indicated that those on low incomes were being spared from most of the cuts, but the estimates presented here actually show that those on minimum pensions and at the lowest wage deciles will see some improvement in income smoothing.

Another interesting case is that of Italy, where the consideration of actual-careers really changes the picture. Firstly this assumption brings out the substantial gender gap in replacement rates that exists in this country. The full-careers assumption had suggested that the gender gap in Italy was higher than in other countries, but not by much. The new estimates, on the other hand, indicate that the generosity of the system to women is very low compared to that of men. This is actually borne out by EU-SILC data, which show that while the aggregate replacement rate for men stands at 64%, that for women is 49%. Secondly, the move to adopting an actual-careers assumption shows that the drop in generosity for men is significantly higher than when one looks at full-careers. Thirdly, while the full-careers assumption seemed to indicate that the gender gap would disappear after the reforms, the new estimates suggest that the system will still provide more generous replacement rates to men.

More evidence can be seen in Table 8.18, which presents for the actual-careers case the projected proportion of retirement with replacement rates less than 60% and the size of the gap from this threshold. The same data in Chapter 6 had suggested that there were no gender differences in Italy using this system adequacy index, and the reform would have no impact. By contrast, Table 8.18 shows the pension system will become much less adequate for women

at the middle wage deciles after the reforms. It also confirms when looking at all women the system is already not that adequate.

Table 8.18: Projected proportion of retirement with replacement rate less than 60% and size of gap from this threshold

a) Men

	30th to 70th wage deciles						*All*	
	% of retirement with low replacement		*Magnitude of replacement gap (%)*		*Index of replacement gap**		*Index of replacement gap**	
	Pre-reform	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*
Austria	0	0	0	0	0.0	0.0	0.0	0.3
Finland	55	50	11	4	6.2	2.1	6.7	3.0
France	86	100	8	21	6.9	21.0	10.8	17.4
Germany	12	33	4	9	0.4	2.9	0.2	1.5
Hungary	0	0	0	0	0.0	0.0	4.4	3.1
Italy	0	0	0	0	0.0	0.0	0.2	0.2
Poland	1	100	0	11	0.0	11.4	2.2	15.6
Slovakia	3	100	1	16	0.0	15.6	0.7	9.2
Sweden	13	85	2	7	0.3	6.2	1.9	3.7
UK	100	100	39	27	39.2	27.3	27.1	16.2

b) Women

	30th to 70th wage deciles						*All*	
	% of retirement with low replacement		*Magnitude of replacement gap (%)*		*Index of replacement gap**		*Index of replacement gap**	
	Pre-reform	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*	*Pre-reform*	*Post-reform*
Austria	0	0	0	0	0.0	0.0	3.7	1.1
Finland	61	54	11	4	7.0	2.2	11.3	6.3
France	100	88	35	18	34.8	15.9	33.7	22.3
Germany	58	37	12	12	7.0	4.3	3.5	1.3
Hungary	4	42	2	4	0.1	1.9	14.6	12.5
Italy	20	100	3	12	0.6	11.7	11.2	15.2
Poland	47	100	8	34	3.8	33.7	20.0	37.4
Slovakia	0	100	0	34	0.0	34.1	2.7	20.0
Sweden	5	94	1	7	0.0	6.9	2.2	10.5
UK	100	80	38	15	38.1	12.3	31.0	4.2

** An index value of 100 implies that all concerned are always without any income during retirement, whereas a value of 0 implies that no one ever spends a year with an income below the 60% threshold. Note: The % of retirement with low replacement is estimated by summing up years during which the replacement rate would be below the 60% threshold for the hypothetical individuals, and then expressing as a % of retirement. The magnitude of replacement gap is estimated by summing for those years at risk of low replacement the difference between the replacement rate and the threshold, and expressing it as a % of the threshold for those years.*

Source: Own analysis of APEX results.

The same can be said for many other countries. The index of replacement gap presented in Chapter 6 suggested that only in the UK, did the state pension system fail to give for a significant proportion of retirement, and by a significant degree, a replacement rate of 60% to women. Table 8.18, conversely, indicates that the French system is worse placed than the UK system at present, and that women in Poland, Hungary, Finland and Italy are not so well-served by existing pension provision. As regards men, while Table 8.18 presents a deterioration compared to what was shown under the full-career hypothesis, this is relatively minor, except for France.

Moving to 2050, one observes that the degree of consumption smoothing, as regards men at the middle wage deciles, declines significantly in France, Poland, Slovakia, and to a much lesser extent in Sweden and Germany. By contrast there is a marked improvement in the UK. Looking at the entire population, the drop in consumption smoothing is very high in Poland and Slovakia, and less so in Sweden and Germany (where those on low incomes are less – and not more – affected by the reforms). As regards the French system, while the situation for the entire population is better than that for those on middle incomes (as provision for those on low incomes has improved), there will still be a deterioration compared to 2005.

As for women, the main difference is the relative performance of the UK system. From being one of the least adequate systems in 2005, the system improves a lot when looking at the entire population. This is not as much the case for women at the middle wage deciles, but even here there is a marked improvement. These trends were not evident in Chapter 6, as the latter did not take into account the high labour participation of women in the UK, as well as the substantial improvements in minimum pension provision.

The situation for women in the majority of countries is set to improve significantly, as projected improvements in labour participation and gender pension age equalisation, complemented in some countries with better minimum pensions, offset the deterioration in pension system rule generosity. Table 8.18, however, confirms that Poland and Slovakia, and to a lesser extent Italy, may face serious gender pension inequality issues over the coming decades. Reforms linking benefits to contributions tend to reduce gender equality, unless accompanied by measures to ensure similar labour market outcomes for the two genders.

Both Figure 8.2 and Table 8.18 show that adopting the actual-careers assumption is crucial to understand the gender inequalities inherent in current pension provision, and try to assess how this might change over time. Moreover, the adoption of the actual-careers assumption brings the computed average replacement ratios much closer to the aggregate

replacement ratio data compiled by Eurostat.[179] The weighted average[180] aggregate replacement ratio, in 2005, amounted to 55% for men and 50% for women. Under the full-career assumption, the relative figures would be 75% and 73%, while under the actual-career assumption the weighted average replacement rate amount to 67% and 55% for men and women, respectively. There already was a high positive correlation between the EU-SILC aggregate replacement ratios and our estimates of the average replacement ratios under the full-career assumption, but this increases further more when the actual-career scenario is adopted.[181] The same occurs when one assesses the correlation between EU-SILC relative income ratios[182] and the replacement ratios under both scenarios.

8.23 The intergenerational balance constraint

Having seen what the adoption of the actual-careers hypothesis implies for the achievement of system goals, we can start looking at the impact on system constraints. Chapter 6 suggested that, on average, the 2050 pensioner generation would, despite the reforms, have a similar level of net pension wealth to that of the 2005 pensioner generation. A simple average across all countries showed that men retiring in 2050 would have a net pension wealth of 109% that of the 2005 generation, while for women the ratio was of 95%. Table 8.19 presents comparative data under the actual-careers assumption. The simple average ratio for men is 105%, while that for women is 97%. Thus, taking into account partial full-time careers and part-time employment, in most cases does not lead to a significant reinterpretation of the overall impact on intergenerational balance among males, and to a more positive picture for women. Changing labour market participation and improving longevity should result in pension entitlements remaining relatively stable in many countries, on average, despite the cuts in system generosity.

[179] The aggregate replacement ratio compares the median pension of persons aged 65-74 to the median wage of those aged 50-59.
[180] The aggregate replacement ratio of each country is weighted according to the size of its pensioner population.
[181] There is a correlation of 0.95 and 0.97 between the aggregate replacement ratio and our estimates of the average replacement ratio for the ten countries under the full-career scenario. These rise to 0.96 and 0.98 under the actual-careers scenario.
[182] Relative income ratios compare the median income of the 65+ population to that of the 0-64 population. The relative income ratios tend to be higher than our estimates of replacement rates, but then pensions form only one component of pensioner incomes.

Table 8.19: The net pension wealth of the 2050 generation compared to that of the 2005 generation under different labour market assumptions (%)

	Male		Female	
	Full-careers assumption^	**Actual-careers assumption***	**Full-careers assumption^**	**Actual-careers assumption***
Austria	109	94	98	87
Finland	114	125	106	119
France	98	101	96	141
Germany	92	104	95	124
Hungary	131	116	112	82
Italy	95	77	87	76
Poland	106	83	69	73
Slovakia	109	80	79	58
Sweden	107	112	100	96
UK	127	127	112	117

^ These indicators are the averages for the 9 hypothetical full-timer full-career workers.
** These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.*
Source: Own analysis using APEX.

Looking at individual countries, the main reassessments in the intergenerational balance following the adoption of the actual-careers hypothesis are for Germany and France (particularly for women). Women in Poland also appear to be in a significantly better position than that portrayed in Chapter 6, though they remain one of the groups which are set to lose most as a result of the reforms. The situation for future pensioners in Slovakia, and to a lesser somewhat extent Hungary, is, conversely, worse than shown in Chapter 6. Women in Slovakia overtake Polish women as the group which, on average, loses the most net pension wealth over time. Moreover future Italian male pensioners are now clear losers from the reforms.

Figure 8.3 examines the development in intergenerational balance in more detail, as it sets out how the different groups within each country will be affected by the reforms and by developments in longevity and labour market participation. The pattern observed in Chapter 6 is relatively unchanged. The development of net pension entitlements in Austria, Germany, France and the UK should favour those on lower incomes, particularly women and those on the minimum pension. By contrast, in Eastern Europe and, to a lesser extent in Sweden, the changes favour those on medium-to-high incomes. The only qualification to the conclusions made in Chapter 6 is that those on minimum incomes appear to be better much protected than those at the bottom wage deciles.

Figure 8.3: The intergenerational balance function – a comparison of the net pension wealth of different income groups in 2050 as a % of that in 2005

Countries where reforms favoured the bottom half of the wage distribution

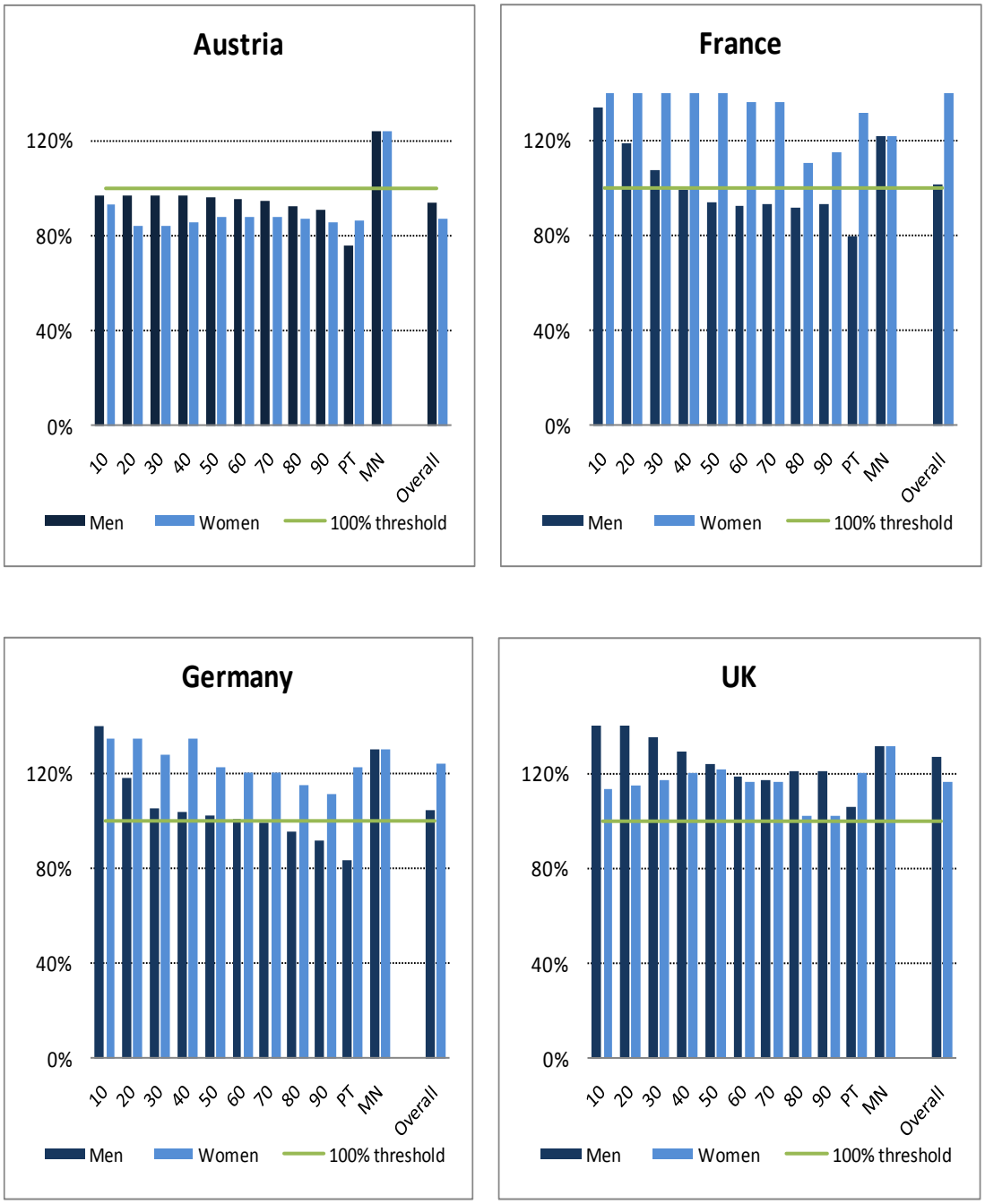


Figure 8.3: The intergenerational balance function – a comparison of the net pension wealth of different income groups in 2050 as a % of that in 2005..cont

Countries where reforms favoured the top half of the wage distribution

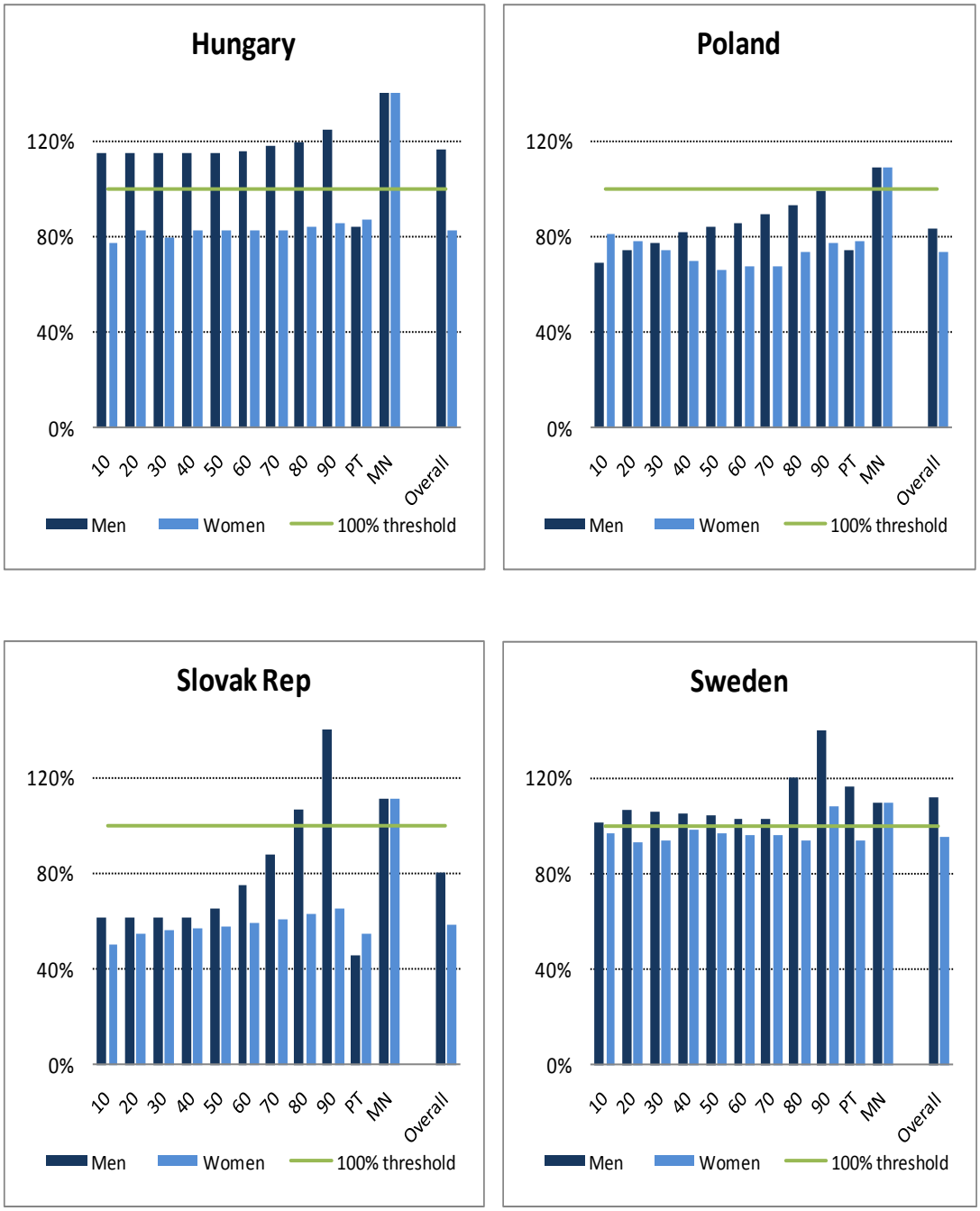


Figure 8.3: The intergenerational balance function – a comparison of the net pension wealth of different income groups in 2050 as a % of that in 2005…cont

Countries where reforms were distribution-neutral

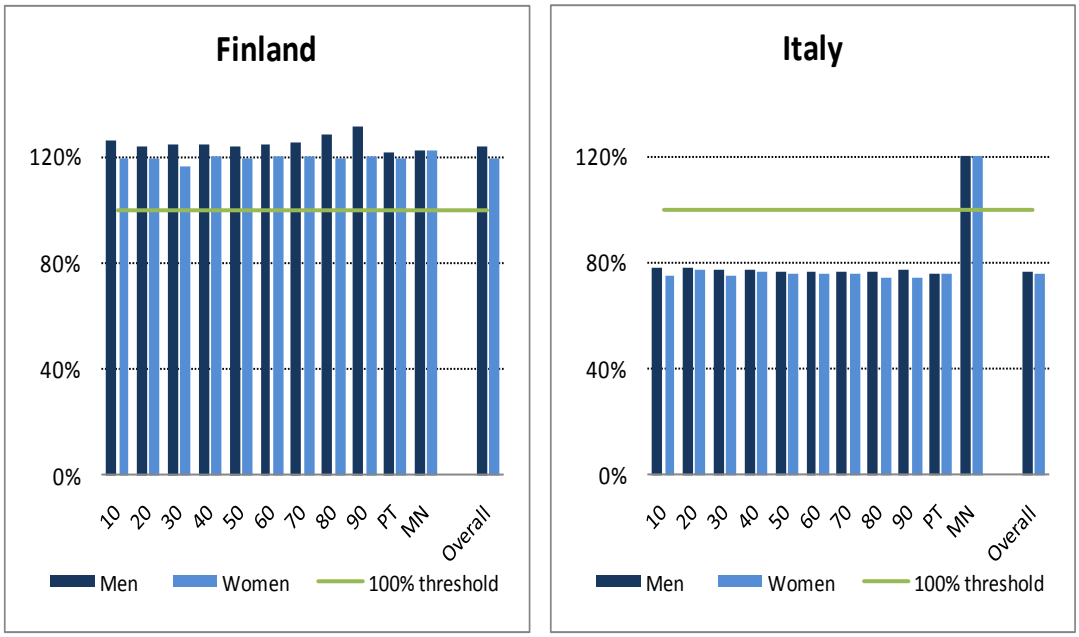


Table 8.20 compares for the two labour market assumptions the proportions of the 2050 generation which are projected to have lower pension wealth compared to the 2005 generation and the size, on average, of the drop. The full-careers assumption had implied that across these ten countries, 40% and 55% of the male and female pensioner generation, respectively, were going to lose out. By contrast, the actual-careers assumption implies that the proportion who stand to lose amounts to 27% among men and 41% among women. On the other hand, the average losses under the actual-careers assumption are significantly higher, particularly for men. Looking at the different countries, while the situation for future French and German pensioners, and for Italian and Polish female pensioners, appears to be much better than that shown in Chapter 6, the prospects for pensioners in Slovakia and for Italian male pensioners are significantly worse. Female pensioners in Hungary and Austria also appear to lose out more.

Table 8.20: Projected losses in pension wealth faced by the 2050 generation

a) Full-careers assumption

	Men			*Women*		
	% of 2050 Generation with lower pension wealth	*Average % decline in pension wealth*	*Index of pension wealth loss**	*% of 2050 Generation with lower pension wealth*	*Average % decline in pension wealth*	*Index of pension wealth loss**
Austria	0	0	0.0	22	7	2.0
Finland	0	0	0.0	0	0	0.0
France	89	3	3.0	78	7	6.0
Germany	100	8	8.0	78	9	7.0
Hungary	0	0	0.0	0	0	0.0
Italy	100	5	5.0	100	13	13.0
Poland	33	7	2.0	100	31	31.0
Slovakia	56	9	5.0	89	24	22.0
Sweden	22	1	0.2	56	3	2.0
UK	0	0	0.0	22	4	1.0

b) Actual-careers assumption

	Men			*Women*		
	% of 2050 Generation with lower pension wealth	*Average % decline in pension wealth*	*Index of pension wealth loss**	*% of 2050 Generation with lower pension wealth*	*Average % decline in pension wealth*	*Index of pension wealth loss**
Austria	56	4	2.2	74	10	7.4
Finland	0	0	0.0	0	0	0.0
France	53	2	1.1	0	0	0.0
Germany	17	3	0.5	0	0	0.0
Hungary	0	0	0.0	61	17	10.4
Italy	79	21	16.6	61	18	11.0
Poland	14	4	0.6	66	22	14.5
Slovakia	53	27	14.3	69	47	32.4
Sweden	0	0	0.0	74	5	3.7
UK	0	0	0.0	0	0	0.0

** The index is estimated by multiplying the % of the 2050 generation with lower pension wealth with the average % decline in its pension wealth (compared to current pensioners). A value of 0 implies that there is no pension wealth loss, while a value of 100 would imply that all pensioners in 2050 had no net pension wealth at all.*

Note: The proportion of the 2050 generation with lower net pension wealth is the number of individuals at wage deciles with projected net pension wealth lower than the 2005 generation, divided by the total number of individuals. The average % decline in net pension wealth is the average decline for those where projected net pension wealth in 2050 is lower than in 2005.

Source: Own analysis using APEX.

8.24 The financial sustainability constraint

The previous sections suggest that pension generosity is much lower than implied by the full-careers hypothesis. That would imply societies face lower fiscal pressures than those presented in Chapters 6 and 7. However, while lower labour participation decreases entitlements, it also negatively affects the financing side of the equation. Benefits are financed by the working population – rather than by the working-age population. This is something many fail to grasp, but which can make a lot of difference. The system dependency ratio (the ratio of beneficiaries to contributors in the pension system) is significantly higher than the demographic dependency ratio (the ratio of people over pension age to those of working age). While, on average, across the ten countries being studied the demographic dependency ratio in 2005 was estimated to be close to 30%, the system dependency ratio was closer to 45%. Moreover there are pronounced differences across countries. The relative gap between the two ratios in Hungary, Poland and Italy is around twice that in Sweden, Finland and the UK

The interplay between these two factors - lower entitlements and fewer contributors - results in some interesting developments in the fiscal sustainability indicator. The average required contribution rate, across all countries, under the actual-careers hypothesis is estimated at 17% as against the 11% shown in Chapter 6 (see Table 8.21). There are several country differences in the gap between the estimated required contribution under the actual-careers assumption and that under the full-careers assumption. For instance, for Italy, Poland and Slovakia the contribution rate under actual-careers is significantly higher.

Table 8.21: Comparing financial sustainability under the different careers assumptions
*a) Full-careers assumption: Long-term contribution rates (% of lifetime wages)**

	2005	*Pre-reform 2050*	*Post-reform 2050*
Austria	13.8	27.3	22.7
Finland	8.5	20.4	18.3
France	14.6	29.6	24.3
Germany	8.0	17.9	14.4
Hungary	22.0	43.0	30.8
Italy	17.3	34.1	24.7
Poland	8.4	30.4	20.7
Slovakia	11.1	35.9	24.6
Sweden	10.1	18.3	16.7
UK	5.8	7.1	6.7
Average^	**11.1**	**23.6**	**18.3**

** This gives the proportion of total lifetime wages needed to finance the net pension wealth of different pensioner generations. Note that here we are assuming that all those of working age participate in full-time labour market activity.*

^ The contribution rate of a country is weighted in line with relative population size.

Table 8.21: Comparing financial sustainability under the different careers assumptions..cont

*b) Actual-careers case: Long-term contribution rates (% of lifetime wages)**

	2005	*Pre-reform 2050*	*Post-reform 2050*
Austria	19.3	47.7	26.8
Finland	8.7	23.7	20.9
France	21.0	50.3	41.4
Germany	11.8	39.6	20.9
Hungary	37.7	80.9	44.5
Italy	29.7	67.1	31.6
Poland	14.4	67.7	34.7
Slovakia	20.6	85.4	38.7
Sweden	11.5	30.4	21.5
UK	9.1	17.6	10.3
Average^	**17.5**	**47.2**	**27.2**

** This gives the proportion of total lifetime wages needed to finance the net pension wealth of different pensioner generations. Note that here we are modifying the demographic data by the actual and projected labour participation rates.*

^ The contribution rate of a country is weighted in line with relative population size.

Source: Own workings using APEX, labour market participation projections and Eurostat population projections.

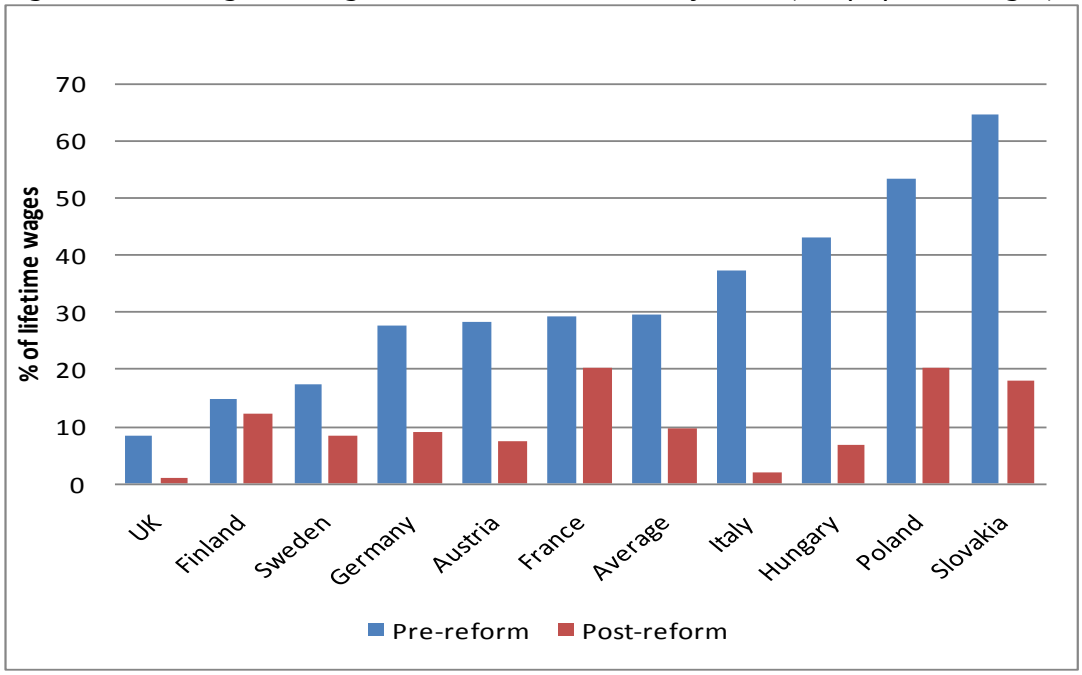
In some countries, such as Sweden and Finland, high labour participation ensures that the required contribution rate when taking into account system dependency ratios, rather than demographic dependency, is not much higher than that estimated in Chapter 6. By contrast, in some Bismarkian systems, like Austria, the effect of much lower female labour participation on the contribution base is partially offset by the relatively weak state pension provision for those with no or little labour market participation, so that the required contribution rate under the actual-careers assumption is much lower than one would expect when simply comparing their system and demographic dependency ratios.

This implies that looking forwards the development of contribution rates under the two scenarios differs in line with trends in labour participation and/or in the generosity of provision for those with low or no labour participation. Table 8.21 suggests that pre-reform systems posed higher fiscal pressures than the full-careers assumption suggested. On average, contribution rates would have had to rise to 47% (rather than 24%). The reforms cut this to 27% in 2050. This is significantly higher than the rate implied by the full-careers assumption, but the ratio between the actual- and full-career contribution rates in 2050 remains quite similar to that in 2005. By contrast, without reform the gap would have been much higher.

Figure 8.4 clearly demonstrates the very important contribution towards financial sustainability of the pension reforms. Had the pre-reform systems remained in place, the

required increase in the contribution rate, across all countries, would have nearly topped 30 percentage points. The reforms reduced this to less than 10 percentage points. Under the pre-reform situation, only the UK would have had such a 'low' required increase. By contrast, in the post-reform situation, only France, Finland, Poland and Slovakia require increases that exceed 10 percentage points. The Eastern European countries and Italy would be heading towards very difficult situations had they kept their old systems. In most cases, the single most important contributor to this improvement was gender pension age equalisation. This policy, very conveniently, will partly offset the retirement of the Baby Boom generation.

Figure 8.4: Change in Long-term contribution rates by 2050 (% of lifetime wages)



A cursory reading of Figure 8.4 would suggest that Poland and France face similar fiscal pressures. However, the increase in the French case reflects a pronounced rise in the pension entitlements of women, on account of higher labour participation, and a strong improvement in pension provision for those on low incomes. The latter two developments are also projected to occur in Germany and the UK, but here the required increase in contribution rates is dampened substantially by the legislated pension age rises for both genders.

The increase in contribution rates is in some cases much higher than the increase in projected pension spending as a % of GDP. As explained in Chapter 5, this reflects two factors. The contribution rate method focuses on the wage base which will finance pension transfers, rather than overall GDP. Moreover it looks at overall transfers to a generation, rather than spending in just one year. Spending in a particular year may not be that high, but one needs to keep in mind that with increased longevity it will need to be financed for longer.

8.3 Comparing the actual-careers and full-careers social sustainability indicators

Having looked at the impact of pension reforms on the sustainability indicators, we can now evaluate the overall impact and compare this assessment with that made in Chapters 6 and 7. Figures 8.5 and 8.6 show the impact of reforms on the average replacement rate and the poverty threshold covered by pensions, and on the contribution rate required and the net pension wealth provided by the systems, under the actual-careers assumption. The first thing to note is that in terms of system achievements, while there is a general downward movement, similar to what was observed in Chapters 6 and 7, there are now more exceptions to this trend (namely Germany, France and Finland, besides the UK – as for Hungary, the new estimates show a decline in system goals). This results in a greater degree of convergence in system outcomes across countries, than that evident under the full-careers case. As for pressures on system constraints, there is a general upward movement, but with a clear inflection versus higher contribution rates. The upward pressure on contribution rates is much stronger under the actual-careers case, as while the number of contributors is lower (reflecting partial careers and absence of labour market participation), the number of beneficiaries remains the same. Moreover the increase in labour participation of women dampens the drop in net pension wealth induced by the reforms.

Figure 8.5: Effect of reforms on system goals (actual-careers assumption)

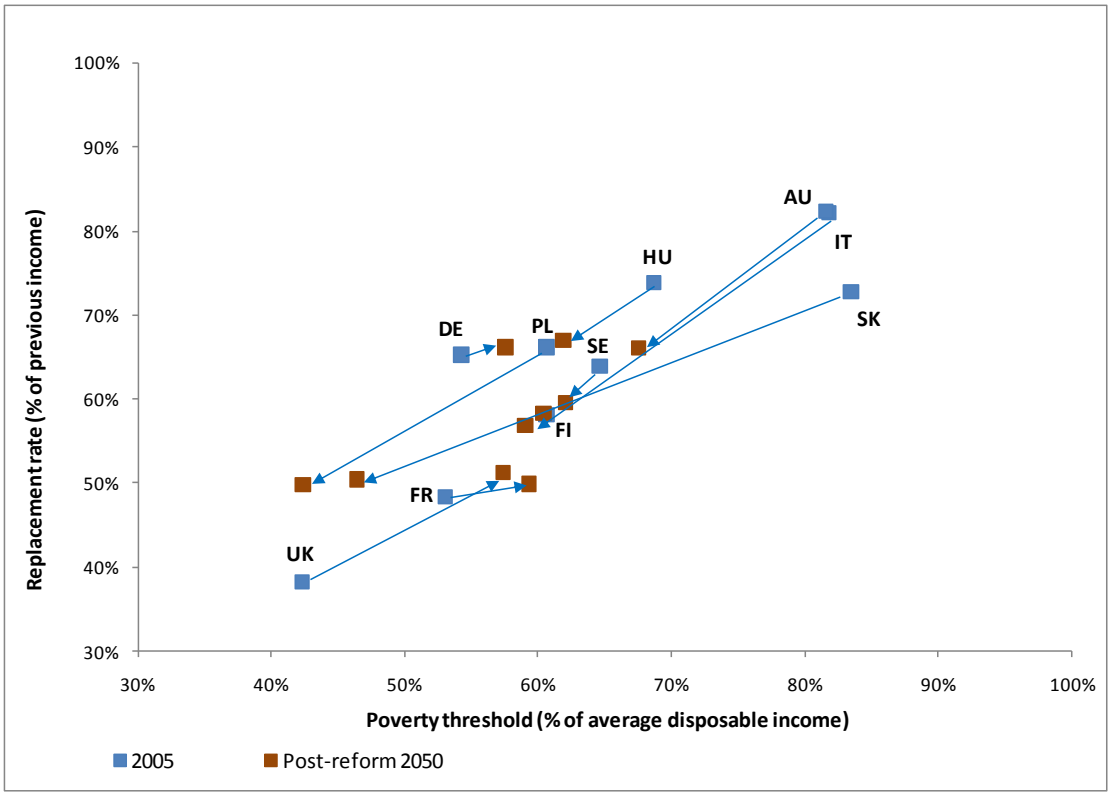
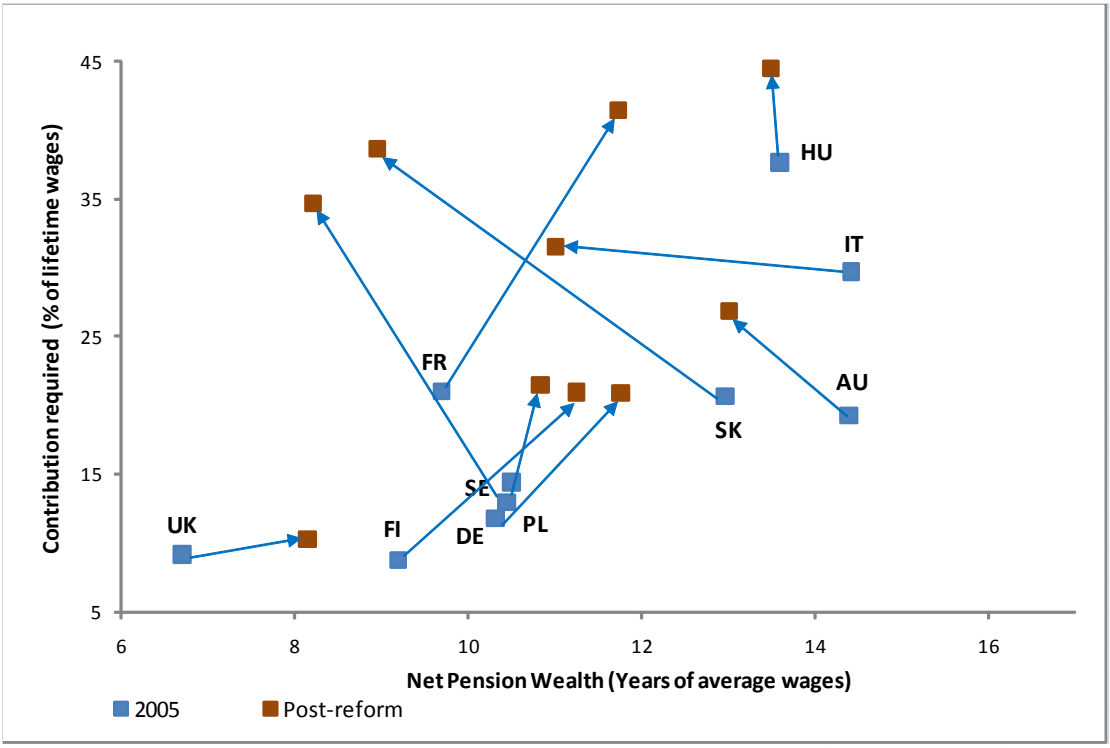


Figure 8.6: Effect of reforms on system constraints (actual-careers assumption)



Adopting the actual-careers assumption also reveals that in most countries, policymakers tried to retain the strength of poverty alleviation, with the drop in consumption smoothing being more pronounced. However there are some exceptions, notably Slovakia and Poland. As can be seen from Figure 8.5, these two countries could end up being outliers in terms of the poverty threshold they provide to people on below-median wages with incomplete contribution records, particularly women. The pension systems in France and the UK will offer the same degree of consumption smoothing on aggregate, but achieve much better poverty thresholds than in Poland and Slovakia. This is an example of how looking at complete careers can underestimate considerably the impact of the reforms, particularly for women. The same consideration can be made for Hungary, which in previous Chapters, had been portrayed as a very generous system becoming even more of an outlier. However taking into consideration labour market participation, this conclusion is completely reversed and the Hungarian system is revealed as converging to average system generosity after reforms.[183] Similarly while Chapter 6 had implied that Italy faced a significant increase in the contribution rate required to finance future pension entitlements, adopting the actual-careers assumption reveals a much lower required rise, as the tighter link between contributions and benefits

[183] This raises concerns about the IMF-inspired pension reform announced in 2009 in Hungary, which could cut generosity substantially.

combines with low labour participation to produce a much stronger effect on system generosity than that shown in the full-careers case.

The new estimates show Germany and France actually improving the achievement of system goals, the exact opposite of what the estimates in previous Chapters suggested. This is the consequence of women accruing better pension entitlements on account of growing labour participation, complemented by the significant improvement of minimum pensions and generosity for those on low incomes. Longer careers, as a result of projected drops in early retirement, also play a role. However the diametrically opposite stances of these countries in respect of the state pension age result in very different pressures on system constraints. France faces by far more of a fiscal challenge than Germany, as the latter's state pension age policy reduces the overall increase in net pension wealth of future generations.

The consideration of labour market participation has introduced a lot of other issues to consider, such as female labour participation, the length of working careers and the presence of part-time employment, besides the impact of longevity improvements and changes in the size of pensioner cohorts considered up to Chapter 7. While we leave the overall assessment of the challenges faced by pension systems in each country, similar to that made in Table 6.18, to the Conclusion; it makes sense at this stage to look into more detail at some country trends.

Figure 8.7 presents country-by-country the development in social sustainability indicators under the two labour market assumptions. To facilitate cross-country comparisons, the same scale was utilised – even though this results in countries with relatively small changes (notably the UK) having a bit unclear movements. The countries have been divided into two groups. The 'high-risk' group, which comprises Austria, Hungary, Italy, Poland and Slovakia, would have experienced very dramatic developments had they not enacted reforms (with contribution rates rising to over 50%).[184] The solid blue lines show the change in system goals and constraints under unchanged pension systems, while the dashed red lines depict the changes induced by the reforms. In the actual-careers case, we assumed that under the unreformed systems labour market participation of women would still have increased (but ignored the effects induced by pension reforms).

As expected from a Bismarkian pension system, the adoption of the actual-careers assumption for Austria results in lower generosity. The impact of the reforms on the achievement of system objectives is also much more pronounced. Compared to the full-career case, the pre-reform system would have had much more serious fiscal repercussions, bringing

[184] The other five countries – who comprise the 'low-risk' group – would have faced contribution rates under the pre-reform system of less than 50%.

the required contribution rate close to 50% of life-time wages. The actual-careers case also reveals that average net pension wealth should decline, reflecting a tighter link between benefits and contributions introduced by the reforms.

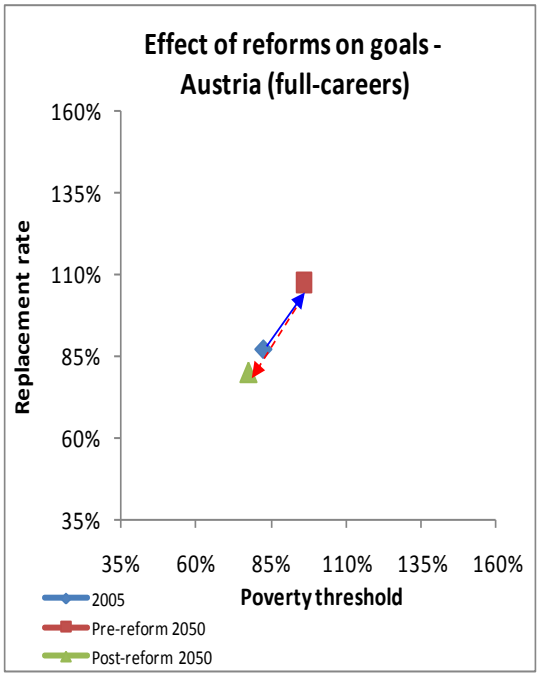
In the currently most expensive systems, Italy and Hungary, the actual-careers hypothesis changes significantly the picture. While the cost of the two systems is revised upwards considerably, as both countries have low labour participation (especially among women), the reforms now appear as constituting a far stronger move towards sustainability than evident under full-careers. However, their pension systems achieve much less under the actual-careers case – reflecting the low participation rate of women and the fact that careers for men tend to be shorter than in other countries. The reforms reduce these achievements further – in contrast to the picture given using full-careers. This confirms the criticisms of the full-careers approach discussed in Chapter 4. When policymakers or researchers use this approach to assess the impact of reforms, they could end up with misleading analysis, particularly of measures introducing tighter links between benefits and career length.

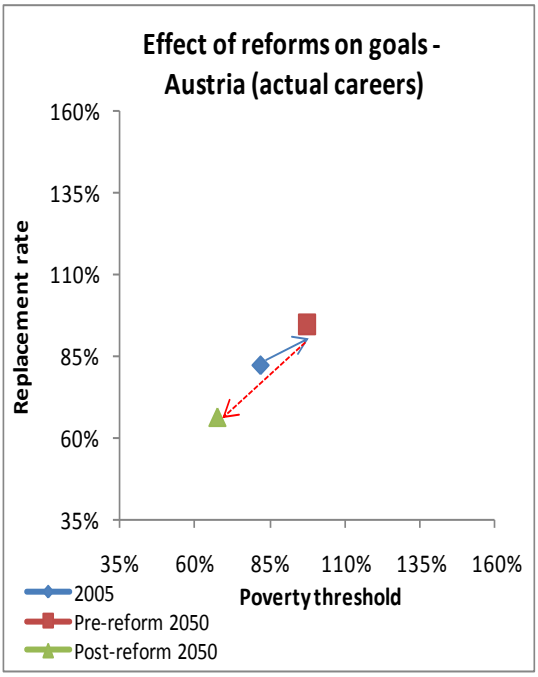
Similar considerations could be made for the two other 'high-risk' countries – Poland and Slovakia. In both, the replacement rates and poverty thresholds that pension transfers can sustain are much less pronounced than in Chapter 6 and 7, and the effects of the reforms are larger. The actual-careers assumption reveals that the expected outcomes for Slovakia are quite close to those in Poland, while the full-careers approach had implied higher relative generosity. Net pension wealth is also now projected to drop by more in both countries, but despite this, their fiscal cost still grows on account of the worsening system dependency ratio.

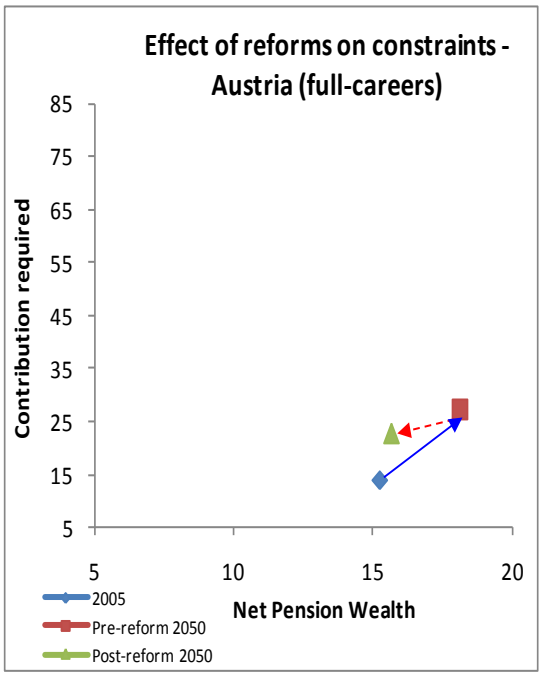
Turning to the low-risk countries, we have already observed the different trends for France and Germany under the actual-careers case. Much the same can be said of the UK, where the consideration of partial careers makes pension transfers slightly more expensive but the way the reforms were structured (i.e. a further increase in progressiveness), underpinned by a higher pension age, not at the expense of the system's relative performance. As regards the two Scandinavian countries, the trends for the actual-careers and the full-careers cases are similar, reflecting high labour participation rates and strong protection for those without full careers, but the effects are larger for the former. The Swedish system appears to be the more stable of the two, in terms of financing pressures, as its net pension wealth, on average, is stable. By contrast, this increases in Finland, compounding the fiscal pressures brought by the ageing transition.

Figure 8.7: Development in social sustainability indicators under the two labour market assumptions: country-by-country analysis

High-risk countries: Austria







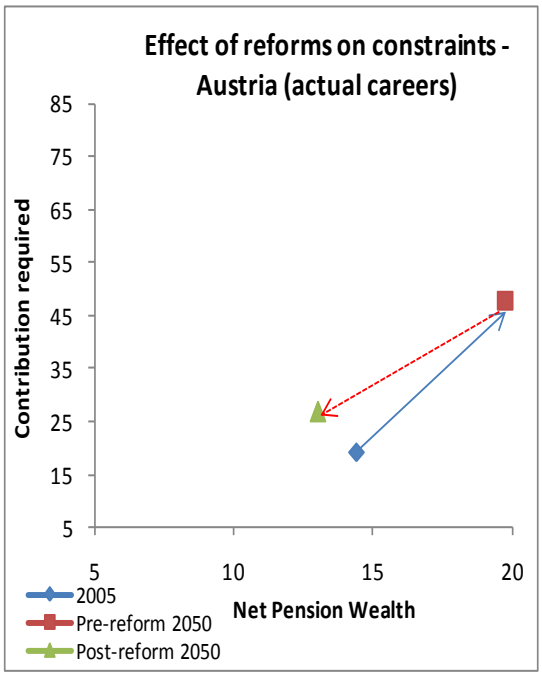
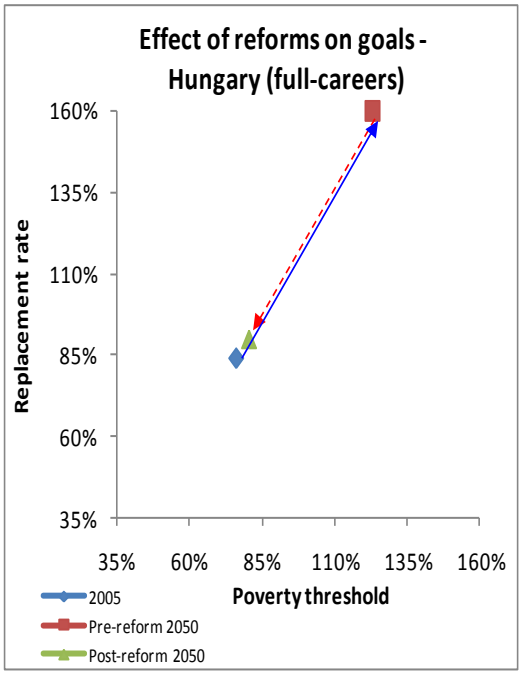
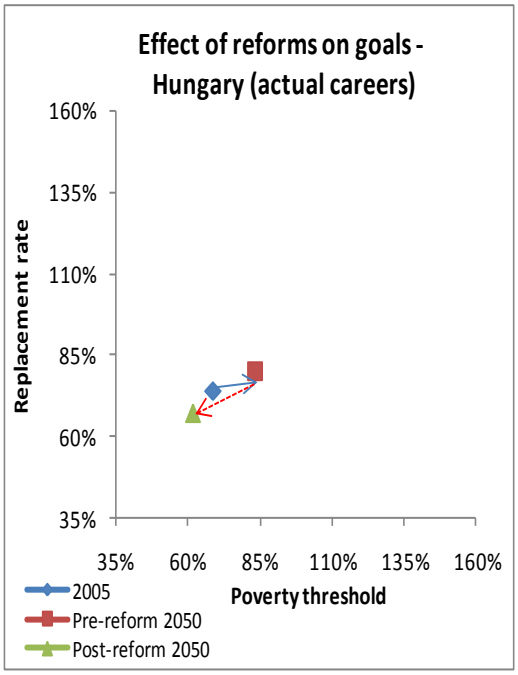
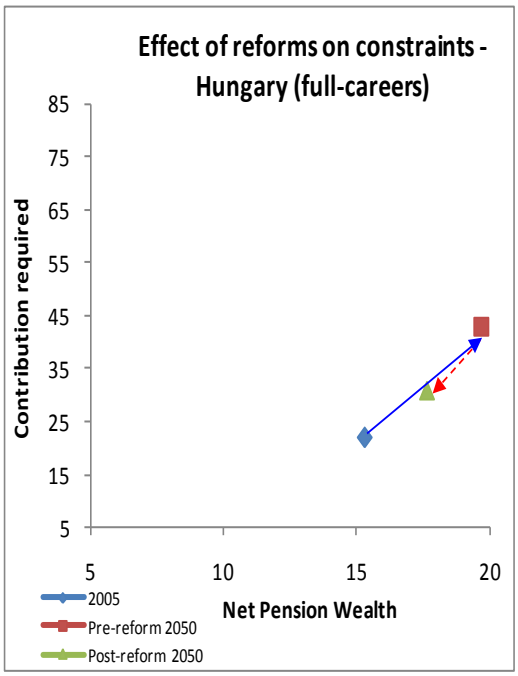


Figure 8.7: Development in social sustainability indicators under the two labour market assumptions: country-by-country analysis..cont

High-risk countries: Hungary







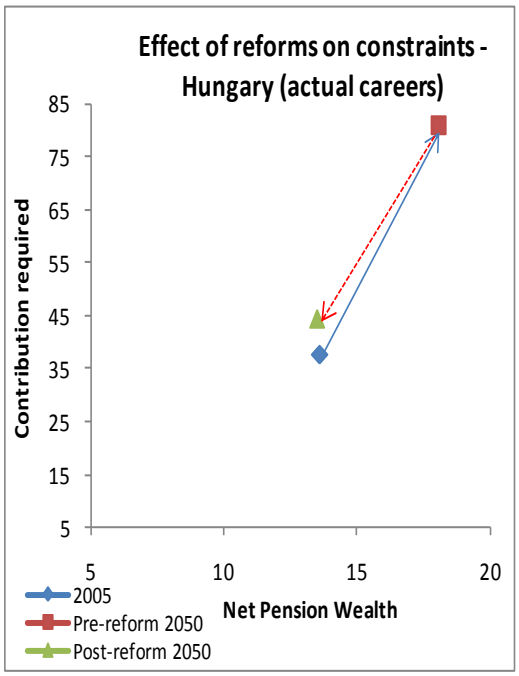
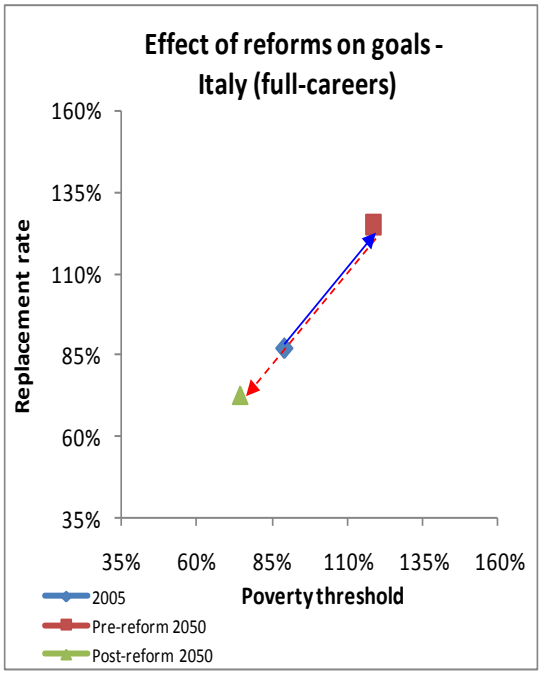
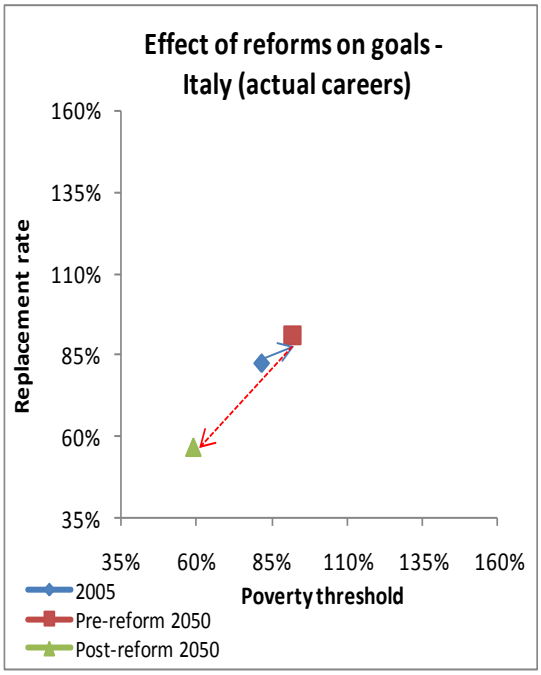
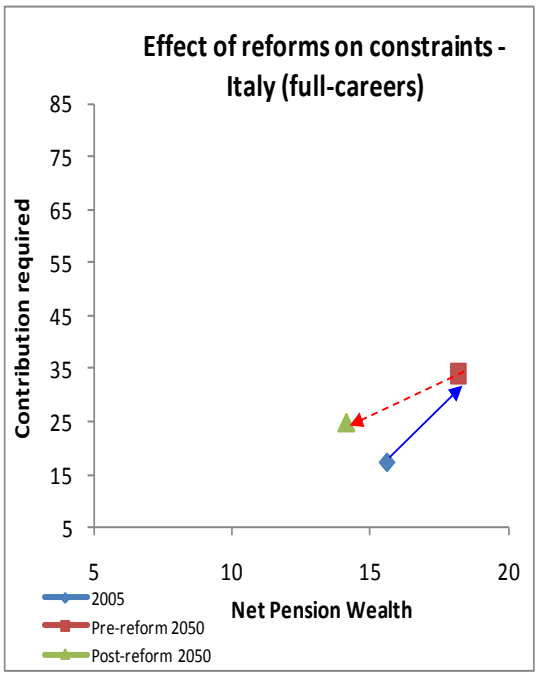


Figure 8.7: Development in social sustainability indicators under the two labour market assumptions: country-by-country analysis..cont

High-risk countries: Italy







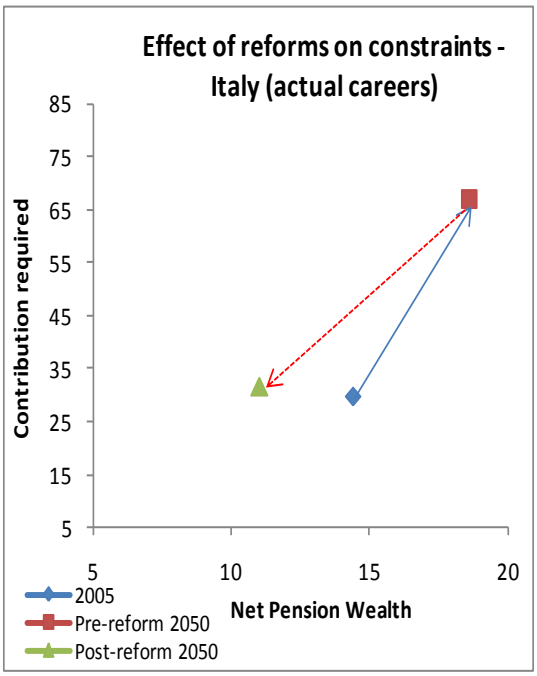
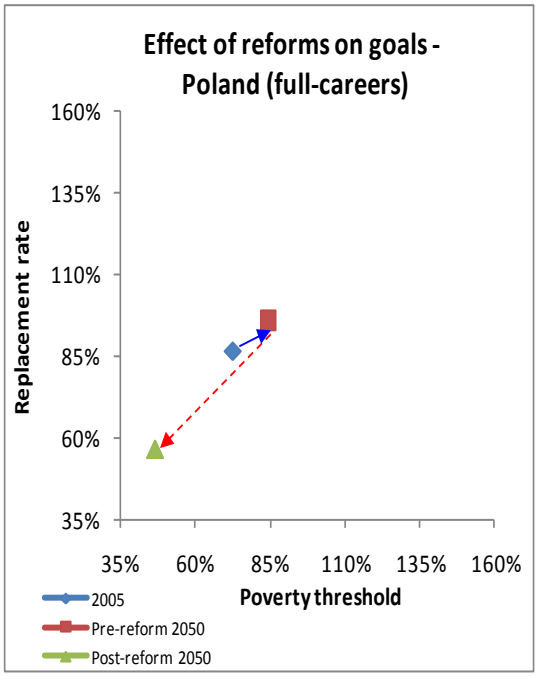
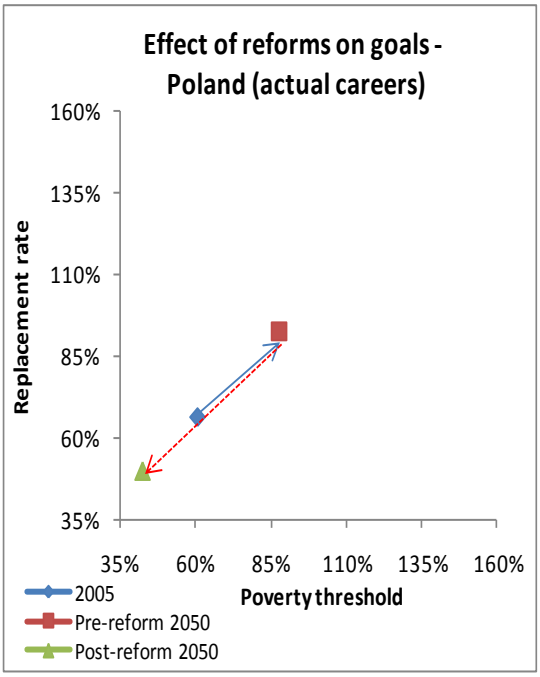
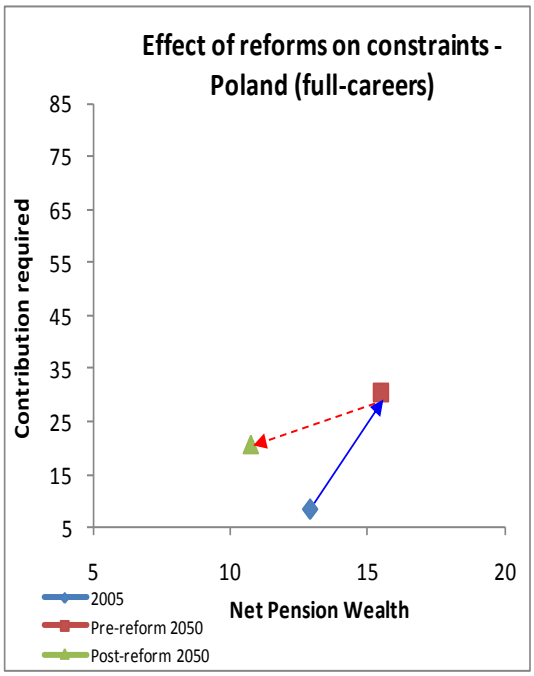


Figure 8.7: Development in social sustainability indicators under the two labour market assumptions: country-by-country analysis

High-risk countries: Poland







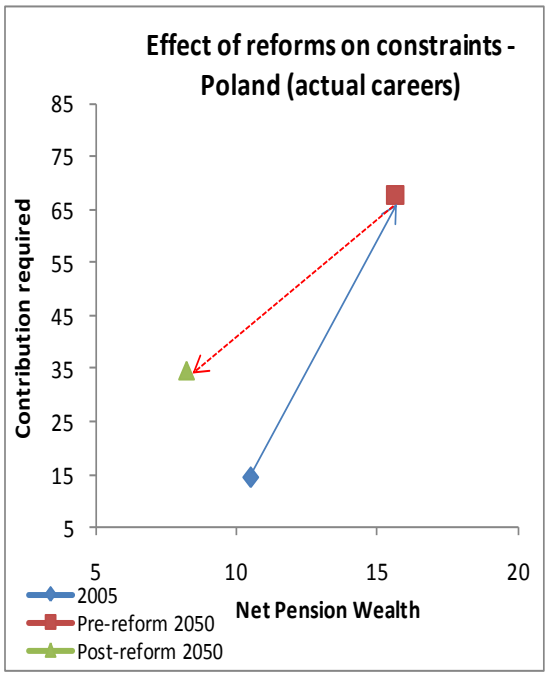


Figure 8.7: Development in social sustainability indicators under the two labour market assumptions: country-by-country analysis

High-risk countries: Slovak Republic

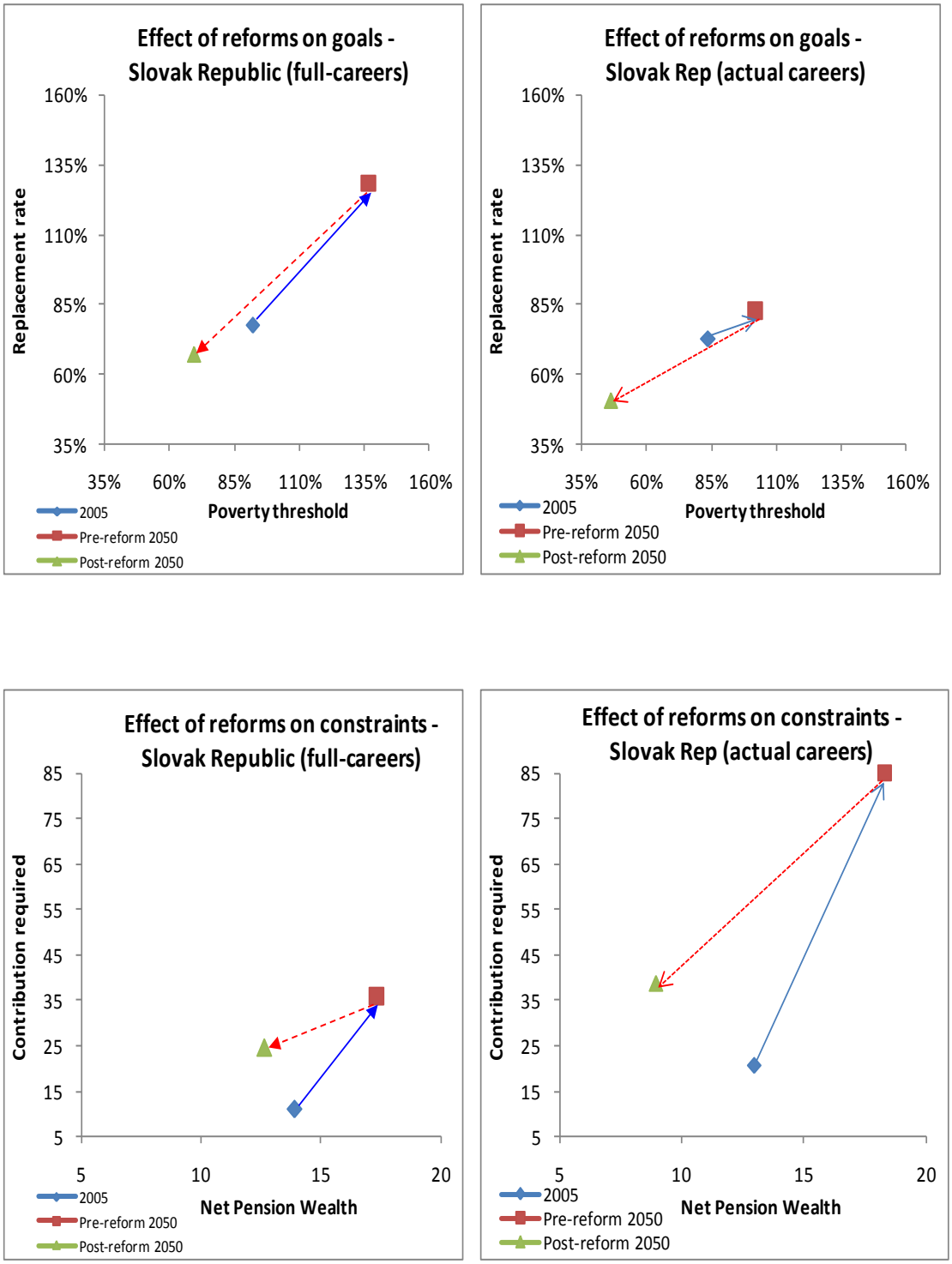


Figure 8.7: Development in social sustainability indicators under the two labour market assumptions: country-by-country analysis

Low-risk countries: Finland

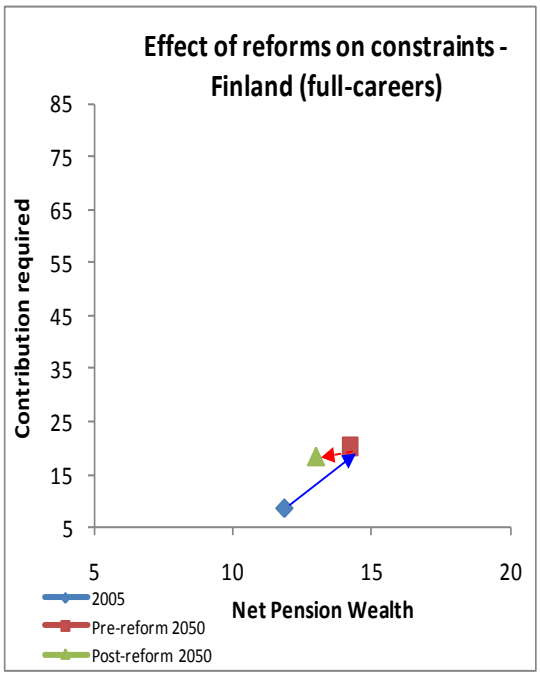


Figure 8.7: Development in social sustainability indicators under the two labour market assumptions: country-by-country analysis

Low-risk countries: France

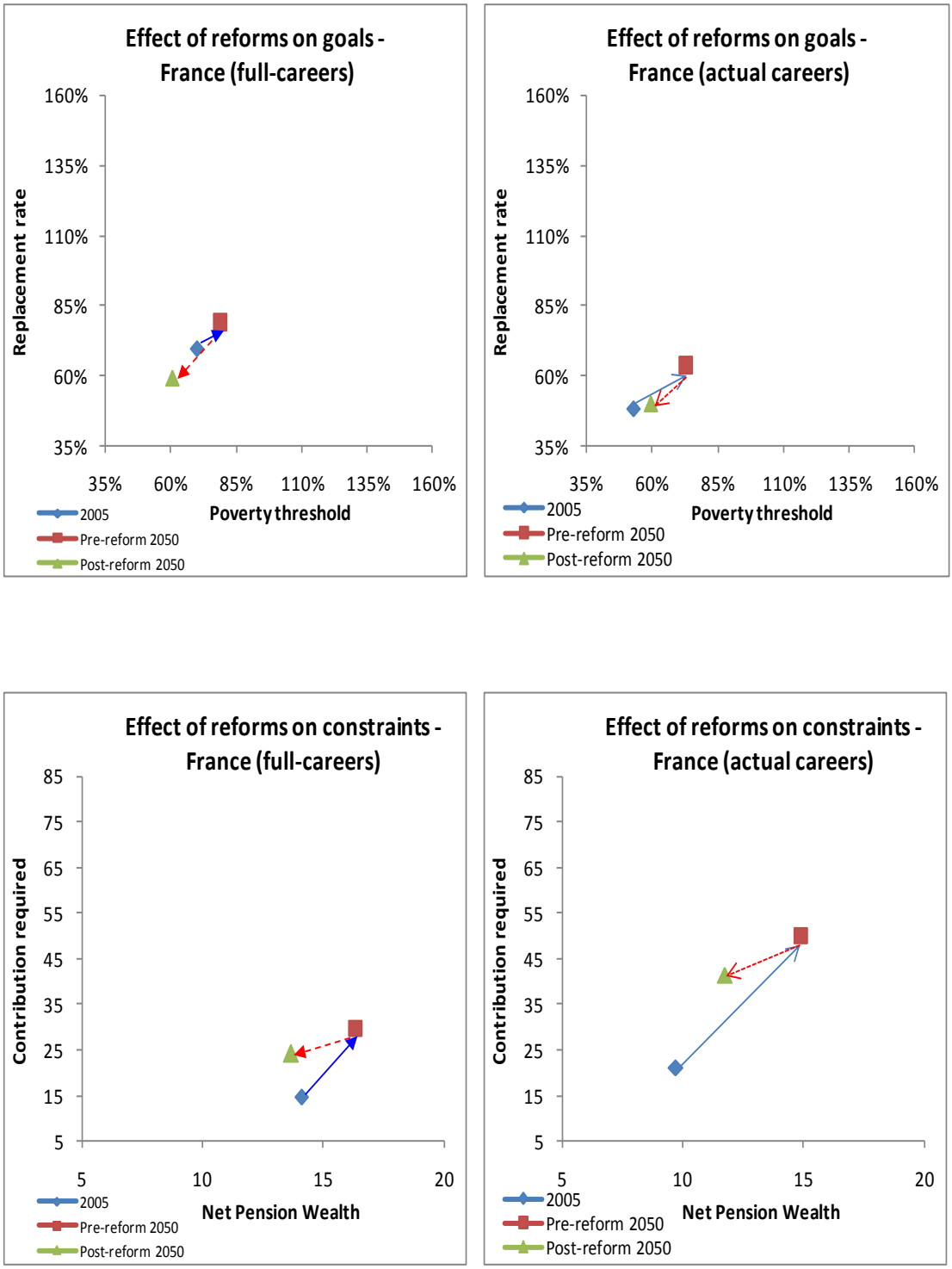


Figure 8.7: Development in social sustainability indicators under the two labour market assumptions: country-by-country analysis

Low-risk countries: Germany

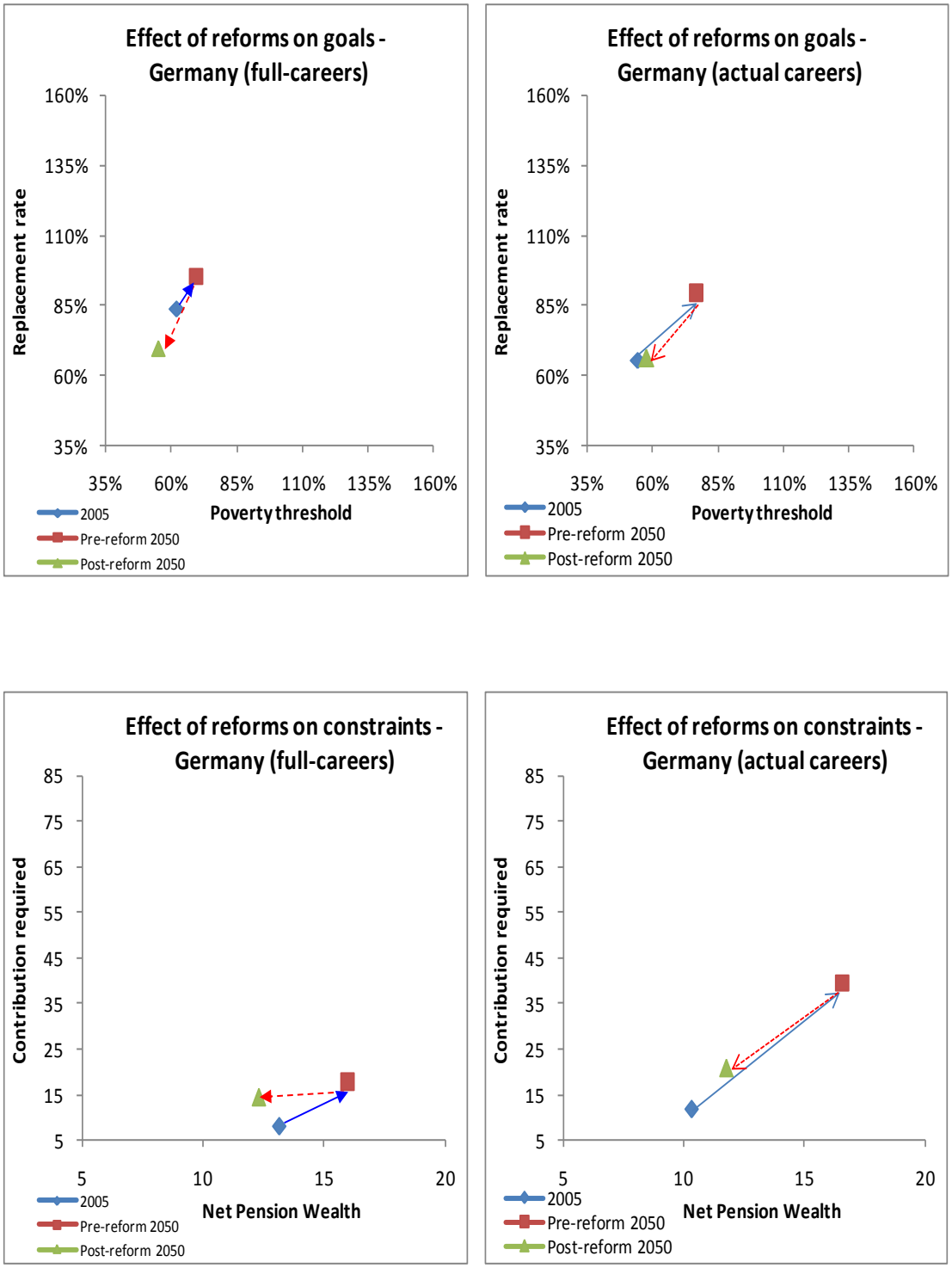


Figure 8.7: Development in social sustainability indicators under the two labour market assumptions: country-by-country analysis

Low-risk countries: Sweden

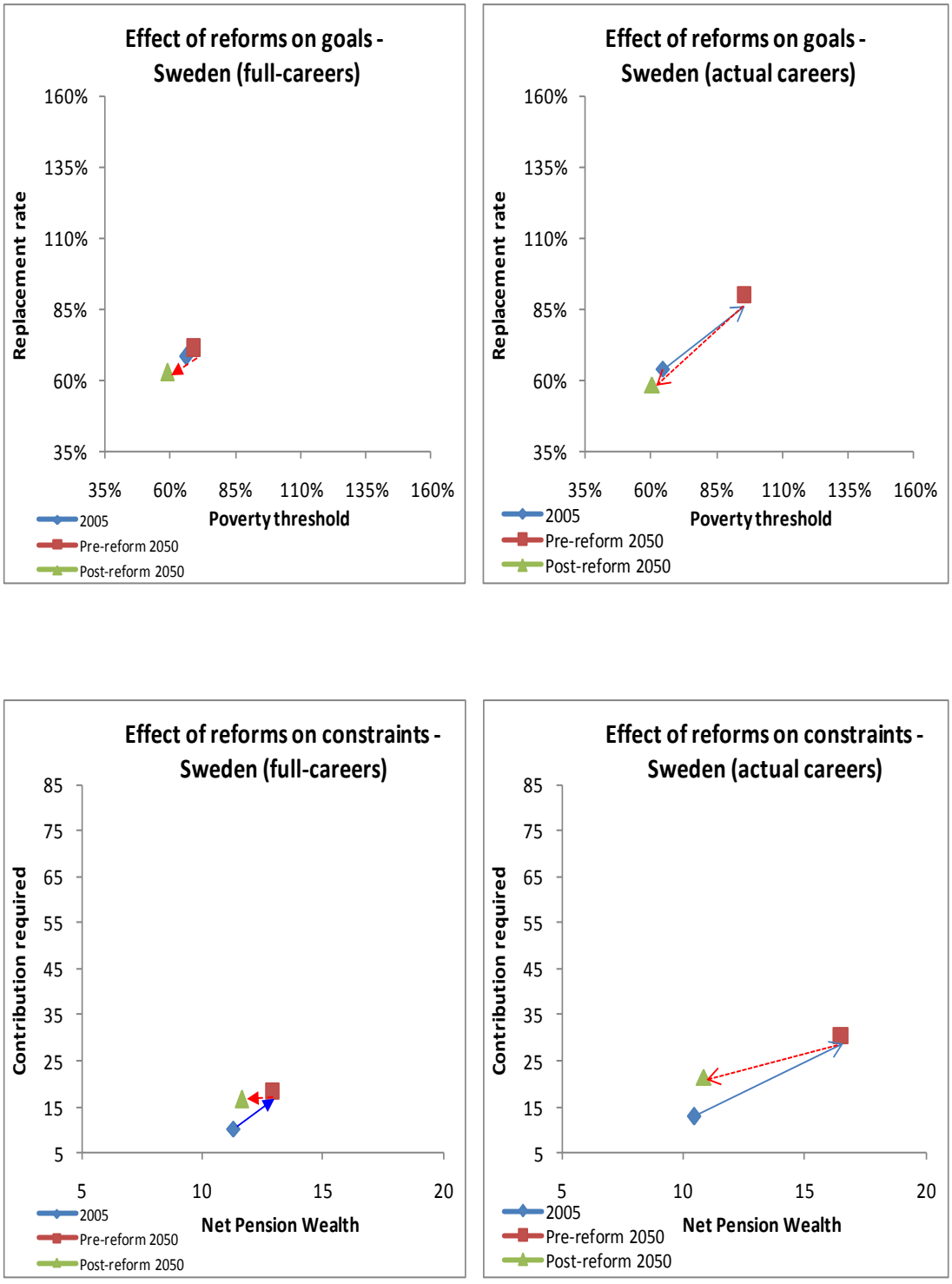
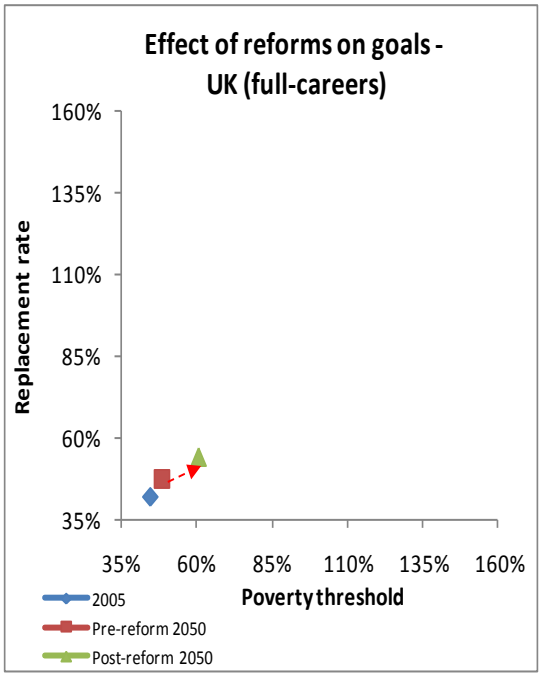
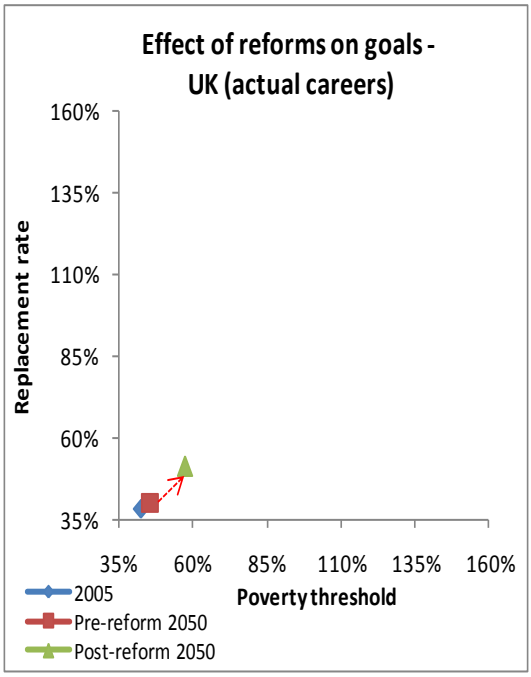
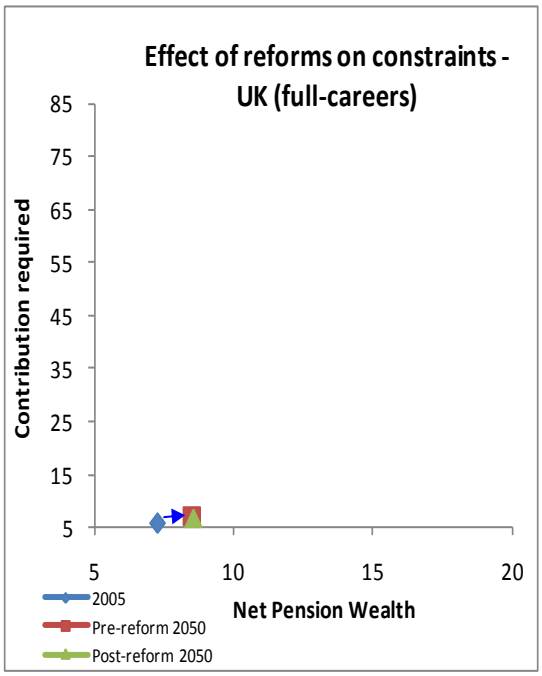


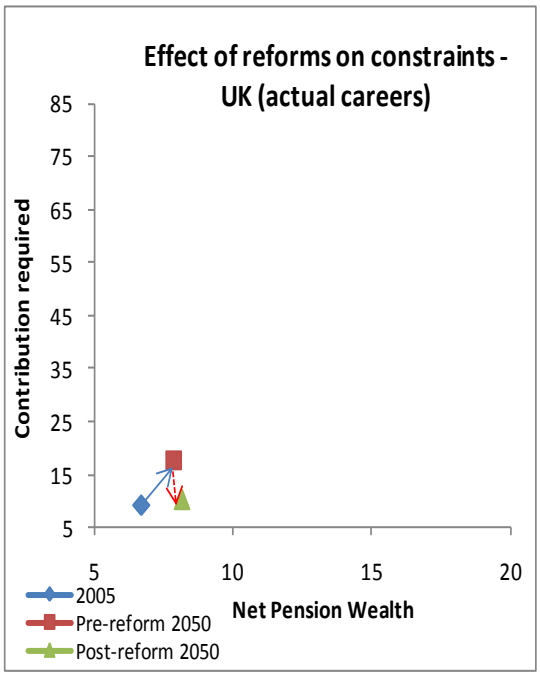
Figure 8.7: Development in social sustainability indicators under the two labour market assumptions: country-by-country analysis

Low-risk countries: UK







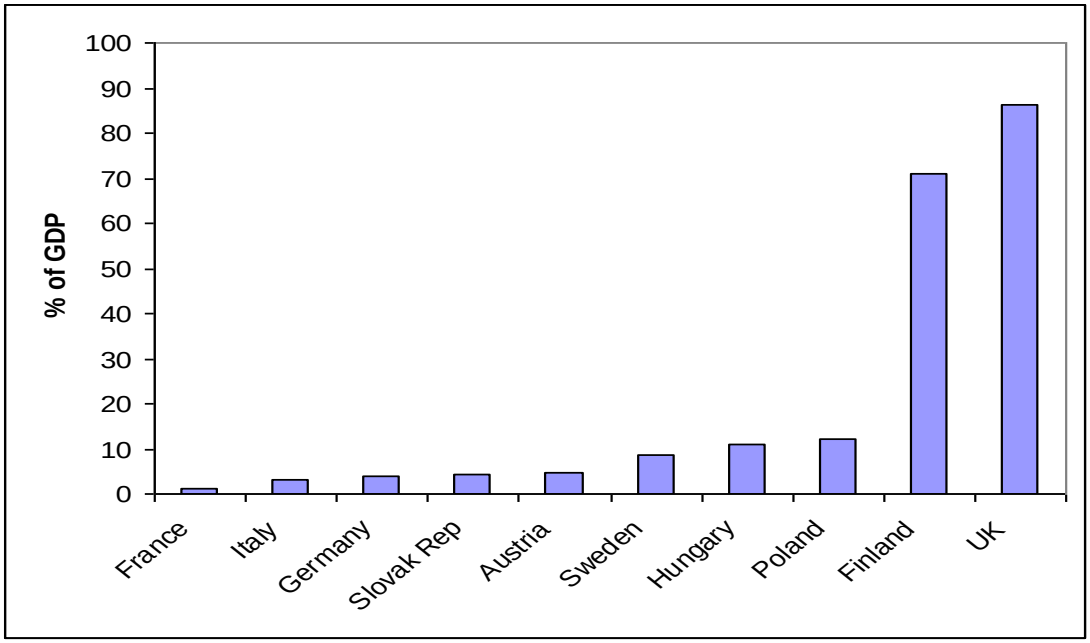


8.4 Change in individuals' pre-retirement savings required to offset the impact of the pension reforms

One way in which individuals can counter the impact of the pension reforms is by extending their working lives. This would not only increase their pension entitlements, but would also reduce their pension requirements. In fact, many governments have framed reforms with the intention of creating incentives for extended working lives. The sensitivity of pension system aims to an increased contributory record will be studied in Section 9.1 of the next Chapter.

The other way in which individuals could accommodate changes in state pensions is by changing their pre-retirement saving behaviour. Again, most governments have based their reforms on the assumption that individuals would react by increasing private retirement provision. Thus, for instance, in the theoretical replacement rate projections presented by governments to the European Commission (see ISG (2009)), private pensions' share of future retirement income is forecast to grow significantly, particularly in Germany and Italy. The 'privatisation' of the pension systems of most Eastern European countries was also seen as a means to generate a fast-growing private pension industry in this region. Figure 8.8 shows how aside from Finland and the UK, the size of pension funds in most countries is marginal.

Figure 8.8: Size of pension funds (2007)



Source: OECD (2008).

In the previous sections of this Chapter we saw how the post-reform state pension systems will have a less strong poverty alleviation function, and also how the degree to which

they allow consumption smoothing will decrease. Moreover we have seen how the reforms reduce the growth in net pension wealth which would have occurred in light of increased longevity. Individuals could counteract these 'losses' by increasing their pre-retirement saving. In this section we will estimate the size of this required saving. Two targets present themselves. In one, the individual would try to get the same level of overall replacement rate as under the pre-reform system (i.e. redress the downward adjustment in the consumption smoothing function of the state pension). In the other, the individual would attempt to get the same net pension wealth as per the pre-reform scenario.

The two scenarios differ in one important perspective – the former takes as granted the reduction in the retirement period brought by any increases in state pension age, whereas the latter assumes that individuals ignore the signal provided by government and attempt to retire at the same age as under the pre-reform system. The second target is harder to achieve, as in most countries the state pension age is set to rise significantly, particularly for women. Note that in some cases, for instance for the UK and Finland, post-reform replacement rates are more generous than under the pre-reform system. This implies that UK[185] and Finnish workers (and other such workers) would not need to save more to achieve the first target. However since in the UK the state pension age is set to rise, even though year-on-year replacement rates are higher, some individuals would still need to increase their saving if they wanted to have the same net pension wealth as before the reforms.

Table 8.22 presents estimates of the required additional saving individuals would need to make in order to maintain the same net pension wealth in 2050 as under the pre-reform pension system. Since most countries will be equalising gender state pension ages during this period, women would face particularly steep saving rates to undo the new pension rules. For instance, women in Slovakia face an increase in the pension age from 57 to 62, together with a large drop in replacement rates due to a very significant reduction in system progressiveness. To fully undo the effect of these changes on net pension wealth, women working full-time and earning the median wage would need to save 30% of their wage (assuming a nominal net rate of return of 5.5%). Even in the UK, where system generosity is increasing substantially, the increase in the state pension age for women would require some women to save part of their income to have the same level of net pension wealth.

[185] The UK, as part of its reforms, is implementing auto-enrolment in workplace-based pensions and/or a newly introduced system of personal accounts. This is intended to provide a quasi-mandatory minimum level of private provision. The impact of this reform is not modelled in this dissertation, but should generally improve replacement rates for those currently without private provision who do not opt-out of this system.

Table 8.22: Required additional saving (% of wages) to maintain same net pension wealth in 2050 as under pre-reform system – assumed net rate of return of 5.5%

a) Men

	10th Decile	20th Decile	30th Decile	40th Decile	50th Decile	60th Decile	70th Decile	80th Decile	90th Decile	Part-time
Austria	7.6	7.6	7.6	7.5	7.7	8.0	8.5	9.2	8.0	8.7
Finland										
France			2.6	4.8	4.8	4.6	5.1	4.7	4.0	5.1
Germany		5.4	5.6	6.1	6.5	7.0	7.7	8.5	9.9	6.4
Hungary	5.4	5.5	5.7	6.0	6.2	6.4	6.9	7.7	8.2	6.6
Italy	13.3	13.4	13.5	13.5	13.7	13.9	13.9	13.6	13.2	13.6
Poland	8.9	7.2	6.3	4.7	4.3	3.7	2.8	1.8	0.6	6.4
Slovakia	17.2	17.6	17.8	17.8	17.7	17.4	17.3	17.5	17.8	17.7
Sweden	3.4	2.1	2.2	2.4	2.5	2.6	2.7			
UK										

b) Women

	10th Decile	20th Decile	30th Decile	40th Decile	50th Decile	60th Decile	70th Decile	80th Decile	90th Decile	Part-time
Austria	13.9	15.9	16.5	16.9	18.1	19.5	21.2	23.1	26.1	19.9
Finland										
France										
Germany		6.8	13.6	15.7	18.8	21.8	22.7	24.1	25.9	17.6
Hungary	17.9	18.1	19.1	19.2	19.9	20.4	21.1	23.3	26.4	19.4
Italy	17.3	17.6	19.6	20.1	21.0	21.9	23.2	24.7	26.5	22.2
Poland	15.4	14.6	13	12.5	11.9	11.0	9.7	8.3	6.7	12.6
Slovakia	28.3	29.1	29.6	29.9	30.3	30.4	30.6	24.1	12.5	29.9
Sweden	5.0	5.1	4.4	3.1	3.3	3.5	3.7	4.0	0.7	3.9
UK			0.4	1.2	2.0	2.8	3.5	4.2	3.6	1.3

Source: Own workings using APEX.

The above results seem to imply that achieving the same net pension wealth as under pre-reform systems is probably beyond the possibilities of most. Note that these estimates, implicitly, assume that individuals in 2050 will have better contributory records than in 2005, with women, in particular, spending more time in formal labour market activity. If one assumes unchanged careers, the required saving rates would be much higher for women in all countries, and also for men in some countries, particularly Germany, Poland and Finland.

Table 8.23 presents an easier target. Here individuals are assumed to take as granted the reduction in pension wealth due to higher pension ages, and instead try to accommodate the change in year-on-year generosity. In other words, they try to boost the new state replacement rate by private saving to get the same overall replacement rate as before the reforms. This reduces the required increase in private saving considerably, particularly among women. For example, the median female full-timer in Slovakia would need to save 19% of

her salary, rather than 30%. Similarly women in Austria would need to save 3%, as against the double-digit rate required to undo the effects of pension age equalisation.

Italy, Slovakia and Poland appear to face the toughest challenges to redress the drop in the strength of state pension consumption smoothing. Given that the replacement rates provided by these systems pre-reform were among the highest in Europe, one might argue that individuals in these countries could accept a cut in their replacement rates. While this may be the case for men in Italy and higher-income individuals in Slovakia and Poland, the argument is not so clear-cut for women and those on low incomes as their post-reform replacement rates could possibly fall below the poverty threshold. Moreover Table 8.23 suggests that those on lower incomes, in general, will face the highest additional saving requirements. Given that private pension provision has tended to be more common among medium- to high-income individuals, this might present particular policy issues.

Table 8.23: Required additional saving (% of wages) to maintain same level of consumption smoothing in 2050 as under pre-reform system – assumed net rate of return of 5.5%

a) Men

	10th Decile	20th Decile	30th Decile	40th Decile	50th Decile	60th Decile	70th Decile	80th Decile	90th Decile	Part-time
Austria	7.6	7.6	7.6	7.5	7.7	8	8.5	9.2	8	8.7
Finland										
France			2.6	4.8	4.8	4.6	5.1	4.7	4	5.1
Germany		0.6	0.8	1.1	1.4	1.8	2.3	3	4	1.4
Hungary	0.4	0.4	0.4	0.4	0.4	0.3				
Italy	13.3	13.4	13.5	13.5	13.7	13.9	13.9	13.6	13.2	13.6
Poland	8.9	7.2	6.3	4.7	4.3	3.7	2.8	1.8	0.6	6.4
Slovakia	12.6	12.9	13.1	13	11.5	7.5	3.6			12.9
Sweden	3.4	2.1	2.2	2.4	2.5	2.6	2.7			
UK										

b) Women

	10th Decile	20th Decile	30th Decile	40th Decile	50th Decile	60th Decile	70th Decile	80th Decile	90th Decile	Part-time
Austria	2.2	3.8	4	3.2	3	3	3	3.1	3.8	3.3
Finland										
France										
Germany								0.2	1	
Hungary	7.8	5.3	6.8	5.6	5.8	6	6.3	5.9	5.6	6
Italy	6.3	5.2	6.2	5.8	5.8	5.8	5.8	6.3	6.4	5.8
Poland	15.4	14.6	13	12.5	11.9	11	9.7	8.3	6.7	12.6
Slovakia	17.7	18.2	18.5	18.7	18.9	18.9	19	16.3	6.6	18.7
Sweden	5	5.1	4.4	3.1	3.3	3.5	3.7	4	0.7	3.9
UK										

Source: Own workings using APEX.

Rather than focusing on pre-reform replacement rates and net pension wealth, one could concentrate on assessing what saving rates would be required to ensure net pension wealth is enough to, on average, keep individuals above the poverty threshold during retirement. These estimates, presented in Table 8.24, confirm that women in Poland and Slovakia face considerable additional saving requirements. Men in the countries studied, broadly speaking, appear to be well protected in terms of poverty alleviation, and in contrast to the picture shown in Tables 8.22 and 8.23 would need to save less than women. The risk posed by the reforms to men is mostly to the strength of the consumption smoothing function.

Table 8.24: Required additional saving (% of wages) to remain, on average, above the poverty threshold throughout retirement – assumed net rate of return of 5.5%

a) Men

	10th Decile	20th Decile	30th Decile	40th Decile	50th Decile	Part-time
Austria						
Finland	0.1					
France	0.6	0.6	0.5	0.5		
Germany	0.5	0.5				
Hungary	1.6	0.1				
Italy						
Poland	5	3.5	1.8	0.1		
Slovakia	3.4	1.4				
Sweden	1					
UK	0.5	0.3	0.2			

b) Women

	10th Decile	20th Decile	30th Decile	40th Decile	50th Decile	Part-time
Austria	3.3	1.8	0.2			
Finland	1.2	0.8	0.8			
France	0.1	0.1	0.1			
Germany	0.5	0.5	0.5	0.5	0.5	0.5
Hungary	4.1	3	1.5			
Italy	4	2.3	1.9	0.6		
Poland	7.6	7.6	7.4	7.3	5.5	7.2
Slovakia	8.6	6.9	5.9	4.8	3.6	4.8
Sweden	3.8	2.4	1.5	0.8	0.3	
UK	1.1	1.1	1	0.9	0.8	0.9

Source: Own workings using APEX.

One may question whether a nominal rate of return of 5.5% is appropriate for countries like Poland and Slovakia which are still catching up to the level of economic development in Western Europe. However, even if higher rates of return are used, the saving requirement for

those on low incomes remains considerable. With a rate of return of 7.5%, women at the bottom wage decile in Poland and Slovakia would need to save 5% and 6% of their income respectively. In contrast if the rate of return falls to 5%, the saving requirement would rise to 8% and 9.5% respectively. Moreover one needs to keep in mind that Section 8.24 suggests that in future workers in these countries will also need to pay much higher contribution rates to finance state pension transfers. As shall be shown in Chapter 9, extending working lives provides a surer way of improving the achievement of pension system objectives.

8.5 Conclusion

The existing comparative literature assessing the effects of reforms on pension adequacy has tended to focus on the effects on those with full careers. This Chapter has sought to address this gap, by taking into account labour market participation. This was shown to be particularly important as labour participation rates, particularly among women, differ greatly across countries. This has important implications for the current and future achievements of pension systems, particularly in terms of fiscal sustainability.

This Chapter has led to a major reassessment of the effectiveness of pension systems in achieving goals. It confirmed that the interaction between the labour market and the social protection system needs to be considered. A system may look very generous on paper, but in practice have only very few individuals qualifying for these benefits. This is particularly true when trying to assess gender gaps in provision. For instance, the strength of the poverty alleviation function shown in this Chapter is lower than that shown in Chapters 6 and 7, and the results in this Chapter are more in line with the actual risk-of-poverty and gender gaps in poverty risks. Much the same can be said in regard of the consumption smoothing function. The replacement rates make more sense in terms of absolute levels and are more closely correlated with the replacement rates one finds using income survey data.

While these are important contributions, potentially the most interesting finding is that labour market trends can act as a countervailing force offsetting partly the pension reforms. This is particularly true in those countries, such as those introducing NDC, where reforms link more closely contributions and benefits. Chapters 6 and 7 had shown women as the main losers of the reforms, with very substantial losses anticipated in some countries. This Chapter reverses to some extent this finding. Higher labour participation might actually result in improvements in pension entitlements despite the reforms, cases in point being France and Germany. Moreover in most countries, cuts in the general pension system's generosity were accompanied by a strengthening of minimum pensions. This has the potential to reduce the

impact of reforms on pensioner poverty. Gender gaps in replacement rates should also decline, as men (with their fuller contributory records) lose more in actual entitlements than women.

The Chapter also presented estimates of the additional saving requirement by which individuals would be able to redress the changes in pension system generosity. These estimates suggest that in most countries individuals would need to save relatively high amounts in order to get the same net pension wealth as per the pension systems of the 2005 generation. A more likely objective is to generate the same replacement rates but accepting the adjustment of state pension ages. This appears to be within the possibilities of most men, but in many countries women would probably need to supplement this saving by also equalising more their contributory record to that of men. However this analysis also confirmed that women and those on low incomes in Poland and Slovakia face very significant challenges in terms of remaining above the poverty threshold during retirement.

Returning once again to the impact of moving away from the full-careers assumption on the social sustainability indicators, this did not result in any significant reinterpretation in the development of intergenerational balance. Rising labour participation and increasing longevity should result in pension wealth rising slightly from current levels. In Chapters 6 and 7, women were seen to lose out, on account of the equalisation of pension ages. Against this, in this Chapter they gain higher entitlements as their labour participation increases by 2050. Turning to financial sustainability, the estimates of the financing requirements of pension systems are significantly higher, on average a contribution rate of 17% is required as against the 11% estimated in earlier Chapters. Moreover in the absence of reforms, fiscal pressures would have increased substantially more than estimated in previous Chapters. The impact of the ageing transition, in fact, would be complemented by the impact of increasing women's entitlement to pensions. The reforms, however, partially address this so that the increase in fiscal pressures by 2050 is not substantially higher that shown in previous Chapters.

The Conclusion will include further analysis, particularly on an individual country basis of the impacts of reforms, taking in consideration the potential impact of labour market participation in offsetting the effects of reforms. However given the significant limitations of the assumptions on career lengths, the next Chapter will study the sensitivity of the social sustainability indicators to different assumptions on career lengths, to the provision of contribution credits for caring and to socio-economic differences in labour market participation and longevity. Chapter 9 will also seek to further explore the sensitivity of the social sustainability indicators to shocks in economic and demographic developments.

9. The sensitivity of the social sustainability indicators to behavioural, economic and longevity changes

The main contribution of Chapter 8 was to set out how significantly labour market participation affects pension entitlements. For instance, it showed that in many countries rising entitlements accruing to women due to increased labour market participation will offset declines in pension system generosity. Moreover the increase in participation should result in improved financial sustainability by shoring up contributions at a time of deteriorating demographics.

Unfortunately the static nature of APEX does not allow the direct interaction between changes in system rules and labour market behaviour. However the model can be used to study the sensitivity of indicators to different assumptions of labour market behaviour. This will be done in the first section of this chapter. These simulations will help to understand the degree of uncertainty surrounding the conclusions made in Chapter 8 and also indicate to what extent promoting longer working lives may result in improvements in the social sustainability of recent pension reforms.

Given that longevity is possibly the main challenge facing pension systems, in the second section of this Chapter, we test the impact that a different assumption on future longevity would have on the development of the social sustainability indicators for the different pension systems. The remaining three sections of this Chapter study other factors which may affect the reliability of the social sustainability indicators, namely the impact of different assumptions for wage growth and future interest rates, the provision of contribution credits for periods spent in unemployment or providing care, and the presence of socio-economic differences in longevity and labour participation. In these sections we will, however, be looking at only a sub-set of the ten systems. In the case of wage growth, 5 countries – representative of the taxonomy developed in Chapter 2 – are selected as the impact tends to be similar across systems of the same typology. Unfortunately APEX does not model pre-reform contribution credits, and so the pre- against post-reform analysis cannot be carried out reliably. However we will be showing estimates for the projected situation in 2050 and some indication of the degree of sensitivity of results to presence of different credits. Different assumptions for market returns only affect entitlements in the pension systems of Sweden and Poland, while the Italian system is affected by different assumptions for GDP growth. Finally lack of data severely limits the analysis of the impact of socio-economic

differences in mortality and labour market participation, and thus the analysis will focus on just Germany and the UK.

At the outset, it should be emphasised that while the evidence presented in this Chapter will enable a better understanding of the accuracy of the indicators shown in Chapter 8, it will still not provide precise and definitive answers. In particular, the absence of any modelling of the impact of household formation and private retirement saving raises a number of concerns in some countries (particularly those which rely more on means-tested benefits). While other approaches, such as dynamic microsimulation, could address these issues, they would themselves face other difficulties (notably it would be difficult to achieve the same degree of understanding of the direct effects of reforms). Besides the construction of a dynamic microsimulation model for ten countries is a task beyond the scope of this research.

9.1 The impact of future labour market participation on social sustainability

Chapter 8 compared the social sustainability indicators under the full-career hypothesis with assumptions better reflecting actual labour market participation. In this section, we will delve more into this topic by developing four different scenarios (set out in Table 9.1) to assess the sensitivity of the indicators to assumptions on future labour market participation. In the first one, labour market participation in 2050 remains at its 2005 level. This isolates the change in the social security indicators induced by the pension reforms. It can be considered as our worst-case scenario. The other three scenarios assume that working lives in 2050 are extended by an additional one, three and five years, respectively, over the Chapter 8 assumptions.[186] Note that in all these scenarios the change would affect all hypothetical cases equally. For the sake of brevity, results are only presented for the aggregate situation, rather than for all the different hypothetical individuals in each country, but important variations are mentioned.

[186] Chapter 6 presents another labour market assumption – namely that of complete full-time careers.

*Table 9.1: Different assumptions on the average effective age of retirement (2050)**
a) Men

	Chapter 8	**Worklife as in 2005**	**Worklife 1 year more than Chapter 8**	**Worklife 3 years more than Chapter 8**	**Worklife 5 years more than Chapter 8**
Austria	56	55	57	59	61
Finland	59	56	60	62	64
France	55	55	56	58	60
Germany	61	57	62	65	66
Hungary	52	51	53	55	57
Italy	57	55	58	60	62
Poland	55	53	56	58	60
Slovakia	55	56	56	58	60
Sweden	62	58	63	65	67
UK	61	58	62	64	66

b) Women

	Chapter 8	**Worklife as in 2005**	**Worklife 1 year more than Chapter 8**	**Worklife 3 years more than Chapter 8**	**Worklife 5 years more than Chapter 8**
Austria	55	49	56	58	60
Finland	59	54	60	62	64
France	53	50	54	56	58
Germany	61	51	62	64	66
Hungary	49	43	50	52	54
Italy	48	43	49	51	53
Poland	48	47	49	51	53
Slovakia	51	50	52	54	56
Sweden	59	56	60	62	64
UK	57	50	58	60	62

**As in Chapter 8, the average effective age of retirement is computed using labour participation rates by age and captures the years spent contributing to pensions.*

Table 9.2 presents the poverty threshold (as a percentage of median disposable income) which entitlements at pension age would permit, on average for the 4 hypothetical individuals of each gender with below-median wages and the part-time worker, weighted by the respective share of full-time and part-time employment now and in 2050.[187] The first thing to notice is that as expected, having higher contributory periods improves generosity in most pension systems. Thus, for example, in Italy if in 2050 men were to still have the same number of contribution years as in 2005, the pension system would support a poverty threshold of 64%, instead of the 68% shown in Chapter 8. Similarly for women there would be a drop of 28

[187] Eurostat and EPC demographic and labour market projections are used for 2050.

percentage points in the poverty threshold, instead of a drop of 18 percentage points. Table 9.2 suggests policymakers do not expect future workers to have the same career length as current workers. However, the loss in generosity for those on low incomes is smaller (and in France and the UK they remain better off even if they retain the same career length).

*Table 9.2: The poverty thresholds (% of median disposable income) achievable in 2005 and change by 2050 under different labour market assumptions**

*a) Men^*

	2005 (%)	**Worklife as in Ch8 (p.p.)**	**Worklife as in 2005 (p.p.)**	**Worklife 1 year more than Ch8 (p.p.)**	**Worklife 3 years more than Ch8 (p.p.)**	**Worklife 5 years more than Ch8 (p.p.)**
Austria	95	-21	-26	-20	-17	-15
Finland	64	+2	-3	+3	+10	+11
France	63	-4	-6	-2	+2	+5
Germany	61	-2	-7	-2	-1	+1
Hungary	70	-5	-10	-4	+2	+5
Italy	95	-27	-31	-25	-23	-21
Poland	66	-16	-20	-14	-13	-11
Slovakia	93	-42	-45	-38	-32	-26
Sweden	70	-5	-9	-4	-1	0
UK	46	+13	+11	+13	+14	+15

*b) Women^*

	2005 (%)	**Worklife as in Ch8 (p.p.)**	**Worklife as in 2005 (p.p.)**	**Worklife 1 year more than Ch8 (p.p.)**	**Worklife 3 years more than Ch8 (p.p.)**	**Worklife 5 years more than Ch8 (p.p.)**
Austria	68	-7	-15	-6	-4	0
Finland	57	+1	-3	+2	+3	+8
France	44	+15	+13	+16	+19	+23
Germany	48	+8	0	+8	+8	+9
Hungary	68	-9	-18	-7	-5	-3
Italy	68	-18	-28	-17	-15	-11
Poland	55	-20	-25	-19	-18	-16
Slovakia	74	-33	-44	-31	-25	-19
Sweden	59	-3	-6	-1	0	+2
UK	39	+17	+15	+18	+19	+20

** This represents the poverty threshold (defined as a % of median disposable income) throughout retirement which net pension wealth at pension age could finance.*

^ These indicators are the weighted averages for 4 hypothetical actual-careers full-timers with below-median wages and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.

Source: Own analysis using APEX.

The absence of improvements in labour participation would be significant in terms of the strength of poverty alleviation. Women, in particular, would be hit. This mostly reflects the fact that state pension ages for women are being equalised for men. In fact, the largest loss would occur to women in Slovakia, where the pension age is being increased the most. However, it is not only pension age equalisation which drives this result. In many countries, the link between contributions and benefits has been strengthened considerably.

The relative change in the poverty threshold induced by an additional 5 years is strongest in Poland, Slovakia, France and Finland and smallest in Germany and the UK. When looking at just women, the pension incentive in Austria and Italy to work longer is also quite strong. The system in Hungary is more generous for those with fuller contribution records, while individuals in Poland, Italy and Slovakia, and men in Austria, still stand to lose a lot even if they work an extra 5 years. It is interesting to note that if working lives increase by 5 years, a slight majority of men and women would see outcomes improve, whereas if they stay unchanged at 2005 levels, this would only be true for the UK (and women in France).

We find similar impacts for consumption smoothing, but with some important differences (see Table 9.3). In previous Chapters, we observed that reforms weaken consumption smoothing noticeably more than poverty alleviation. The estimates presented in Table 9.3 suggest that even with longer career lengths, the reforms will have a larger relative effect on replacement rates than on achievable poverty thresholds. In fact, out of the twenty cases (the weighted average for men and women for the ten countries), an increase of 5 contribution years would lead to better replacement rates in ten cases, whereas under the same conditions poverty thresholds improve in twelve cases. In most countries, those at the bottom of the wage distribution face lower penalties for shorter working lives.

The objectives of policymakers are evident from the estimates in Table 9.3. They have imposed significant financial disincentives for maintaining career lengths unchanged and considerable rewards for extending working lives. However it is interesting to note that in some countries, notably Italy and Austria (in both cases for men), Poland and Slovakia, generosity still declines considerably even if contributory records improve noticeably. In these cases, the presence of very large pension outlays may have led policymakers to focus on cutting financial burdens, rather than overly rewarding longer working careers. The extent of the cuts faced by men in Italy and, slightly less so, by women in Poland, is very high. By contrast, the Swedish system maintains unchanged generosity if individuals, on average, retire around age 65. The same applies to the French and German cases, where replacement rates remain stable at 2005 levels if individuals retire at the legislated pension age. One point to

note is that while there are considerable financial advantages to working beyond pension age, in practice, even with an additional 5 years of contributions, most people would still not be accessing these bonuses, as working lives would still fall short of legislated pension ages.

*Table 9.3: The overall replacement ratio (% of pre-retirement wage) achievable in 2005 and change by 2050 under different labour market assumptions**
*a) Men^*

	2005 (%)	**Worklife as in Ch8 (p.p.)**	**Worklife as in 2005 (p.p.)**	**Worklife 1 year more than Ch8 (p.p.)**	**Worklife 3 years more than Ch8 (p.p.)**	**Worklife 5 years more than Ch8 (p.p.)**
Austria	89	-23	-27	-22	-20	-18
Finland	59	0	-4	+1	+2	+3
France	56	+2	-2	+3	+7	+8
Germany	71	-2	-3	-1	+1	+3
Hungary	74	-12	-16	-11	-6	-3
Italy	92	-33	-36	-32	-29	-29
Poland	67	-11	-15	-10	-8	-7
Slovakia	62	-6	-9	-5	-3	-2
Sweden	66	-7	-9	-4	+1	+6
UK	37	+16	+15	+16	+17	+17

*b) Women^*

	2005 (%)	**Worklife as in Ch8 (p.p.)**	**Worklife as in 2005 (p.p.)**	**Worklife 1 year more than Ch8 (p.p.)**	**Worklife 3 years more than Ch8 (p.p.)**	**Worklife 5 years more than Ch8 (p.p.)**
Austria	75	-9	-16	-8	-6	-3
Finland	58	+2	-6	+2	+1	+2
France	41	+10	+7	+10	+12	+15
Germany	59	+8	+7	+9	+11	+13
Hungary	74	-10	-19	-9	-5	-4
Italy	65	-15	-21	-14	-13	-10
Poland	65	-22	-26	-21	-21	-20
Slovakia	75	-19	-23	-18	-15	-14
Sweden	66	-9	-17	-7	-2	+2
UK	40	+17	+14	+17	+19	+19

** This represents the replacement rate (defined in terms of pre-retirement income) throughout retirement which net pension wealth at pension age could finance.*
^ These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the share of full-time and part-time work in each country.
Source: Own analysis using APEX.

One of the most interesting findings of previous Chapters was that in most cases, the reforms do not have a significant impact on the size of intergenerational transfers. Cuts in pension wealth due to changes in system generosity tend to be offset by increases due to higher longevity. Table 9.4 investigates whether this still applies with different assumptions on working lives.

Table 9.4: The net pension wealth of the 2050 generation as a percentage of that of the 2005 generation under different labour market assumptions
*a) Men^*

	Worklife as in Ch8	**Worklife as in 2005**	**Worklife 1 year more than Ch8**	**Worklife 3 years more than Ch8**	**Worklife 5 years more than Ch8**
Austria	94	91	97	100	103
Finland	125	118	127	136	138
France	101	102	105	109	112
Germany	104	99	106	107	109
Hungary	116	110	121	127	133
Italy	77	76	82	84	86
Poland	83	77	84	87	89
Slovakia	80	79	87	92	100
Sweden	112	106	114	116	119
UK	127	124	128	129	130

*b) Women^*

	Worklife as in Ch8	**Worklife as in 2005**	**Worklife 1 year more than Ch8**	**Worklife 3 years more than Ch8**	**Worklife 5 years more than Ch8**
Austria	87	81	91	93	97
Finland	119	113	121	124	132
France	141	135	138	142	146
Germany	124	111	124	123	125
Hungary	82	76	88	92	88
Italy	76	74	82	84	87
Poland	73	67	74	75	77
Slovakia	58	57	68	72	77
Sweden	96	91	98	101	103
UK	117	114	119	121	122

^ These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.
Source: Own analysis using APEX.

The immediate impression is that, particularly for men, longer working lives could result in considerably higher entitlements. However, in the UK and Finland, the net pension

wealth of the 2050 generation would still be considerably higher than that of the 2005 generation even if the length of the contributory period remains unchanged at 2005 levels. German and French women also appear to have considerably higher overall pension transfers. Table 9.4 shows that longer working lives would dampen the risks of pension wealth loss faced in Austria, Slovakia and Italy.

While these bigger pension transfers may raise intergenerational concerns, Table 9.5 shows that extended working lives would help reduce the financing problem of state pensions. An additional five years of contributions would cut the increase in the financing requirement of state pensions by about a quarter, on average, across all countries. An increase of three years in working lives would cut the required increase in contributions by a tenth. What is quite striking in Table 9.5 is that if labour participation were to remain unchanged at 2005 levels, the financial burden of pension systems would not increase as much as anticipated in Chapter 8. Essentially this reflects the fact that in most countries, the increase in female labour participation results in considerably higher pension entitlements at a time when the size of this group is growing. Since pension reforms have linked more directly benefits and contributions, if women were to retain their current labour participation, the cost to governments of future pensions would not increase. However as shown in Tables 9.2 and 9.3 this would exacerbate the already worrying pension adequacy gender gap.

*Table 9.5: Long-term contribution rates (% of lifetime wages) in 2005 and change by 2050 under the different labour market assumptions**

	2005	**Worklife as in Ch8 (p.p.)**	**Worklife as in 2005 (p.p.)**	**Worklife 1 year more than Ch8 (p.p.)**	**Worklife 3 years more than Ch8 (p.p.)**	**Worklife 5 years more than Ch8 (p.p.)**
Austria	19.3	+7.5	+5.4	+7.2	+6.7	+5.5
Finland	8.7	+12.2	+10.7	+11.9	+12.2	+11.1
France	21.0	+20.4	+19.7	+19.6	+18.5	+16.2
Germany	11.8	+9.1	+7.1	+8.8	+7.9	+7.1
Hungary	37.7	+6.8	+1.6	+5.6	+4.7	+1.2
Italy	29.7	+1.9	+1.2	+1.8	+1.6	+1.4
Poland	14.4	+20.3	+17.1	+19.7	+18.2	+16.1
Slovakia	20.6	+18.1	+14.5	+17.3	+18.2	+15.8
Sweden	11.5	+10.0	+8.8	+9.6	+8.9	+7.8
UK	9.1	+1.2	+1.0	+1.1	+0.9	+0.8

** This gives the proportion of total lifetime wages needed to finance the net pension wealth of different pensioner generations.*

Source: Own workings using APEX, labour market participation projections and Eurostat population projections.

9.2 The impact of higher future longevity on social sustainability

Chapter 3 showed how most recent pension reforms have been driven by concerns about demographic developments. Initially the retirement of the Baby Boom generation was the issue at the forefront of these concerns, but increasingly policymakers have become more aware of the impact of longevity. While the retirement of the Baby Boom generation presents a temporary (though substantial) challenge for pension systems, longevity improvements are a dynamic and long-term test. Moreover while the size of the potential pension entitlements of the Baby Boom generation can, to some extent, be measured, longevity improvements are notoriously hard to predict. This raises the prospect that policymakers will have to reassess their reforms ever so often that new evidence of longevity improvements is observed. In some cases, notably in countries which introduced NDC systems, policymakers have sought to escape this conundrum by introducing automatic mechanisms which maintain the pension system in balance. In this section, we will attempt to assess what would happen to the social sustainability indicators were longevity to be 2 years higher than assumed in Chapter 8 (see Table 9.6). The choice of an additional rise of 2 years is to bring longevity improvements by 2050 more in line with those registered in recent decades (rather than the deceleration assumed in projections).

Table 9.6: Different assumptions for longevity (period life expectancy) at pension age in 2050 (years)

a) Men

	Longevity in Chapter 8	**Longevity 2 years more than Chapter 8**
Austria	23	25
Finland	21	23
France	28	30
Germany	20	22
Hungary	23	25
Italy	22	24
Poland	20	22
Slovakia	22	24
Sweden	21	23
UK	18	20

Table 9.6: Different assumptions for longevity (period life expectancy) at pension age in 2050 (years)..cont

b) Women

	Longevity in Chapter 8	**Longevity 2 years more than Chapter 8**
Austria	26	28
Finland	25	27
France	33	35
Germany	23	25
Hungary	26	28
Italy	26	28
Poland	28	30
Slovakia	25	27
Sweden	25	27
UK	20	22

A priori, one would expect that in countries which have not introduced mechanisms that automatically insulate their pension system from the effects of longevity improvements, longer lives should result in higher-than-expected transfers to pensioners and greater financial pressures. The probable effect on system goals is less obvious. In systems where benefits are uprated in line with prices, longer lives would result in benefits losing relative value during the additional years in retirement. The presence of minimum benefits could limit this effect, however.

Table 9.7 presents the impact of a two year larger increase in longevity on the poverty thresholds (as a % of median disposable income) which net pension wealth at the point of retirement could finance, on average. In the majority of cases, the poverty thresholds that can be financed decline. This development mainly reflects the indexation of pension benefits (refer to Section 9.41 for details of each country). In countries where benefits are mostly indexed to wages, such as Germany, Hungary and Slovakia there is little if any decline. Note that the biggest losses are felt by those with relatively high pension entitlements – for instance, Austrian and Italian men – as below-wage indexation over a longer period impacts them relatively more. The somewhat stronger effects shown for men also reflect the fact that a two-year increase in longevity comprises a larger relative increase in retirement than that for women (as they live longer than men).

*Table 9.7: The poverty thresholds achievable in 2005 and change in percentage points (p.p.) by 2050 under different longevity at retirement assumptions**
*a) Men^*

	2005 (%)	**Longevity as in Ch8 (p.p.)**	**Longevity 2 years more than Ch8 (p.p.)**
Austria	95	-21	-23
Finland	64	+2	+1
France	63	-4	-5
Germany	61	-2	-2
Hungary	70	-5	-5
Italy	95	-27	-29
Poland	66	-16	-17
Slovakia	93	-42	-42
Sweden	70	-5	-6
UK	46	+13	+12

*b) Women^*

	2005 (%)	**Longevity as in Ch8 (p.p.)**	**Longevity 2 years more than Ch8 (p.p.)**
Austria	68	-7	-8
Finland	57	+1	0
France	44	+15	+14
Germany	48	+8	+8
Hungary	68	-9	-9
Italy	68	-18	-19
Poland	55	-20	-21
Slovakia	74	-33	-33
Sweden	59	-3	-4
UK	39	+17	+16

** This represents the poverty threshold (defined as a % of median disposable income) throughout retirement which net pension wealth at pension age could finance.*
^ These indicators are the weighted averages for 4 hypothetical actual-careers full-timers with below-median wages and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.
Source: Own analysis using APEX.

These estimates are for a synthetic average (of our hypothetical individuals with below-median wages and our part-time worker) and show whether on average during retirement they would stay above the threshold. As explained in earlier Chapters, the latter fact does not necessarily mean that they will always be above it. In fact, in a significant number of cases, the individual would start above the poverty threshold but then fall into poverty with age due to indexation being below the increase in average wages. As shall be seen in Section 9.41, only in Germany are all state pension elements indexed to wages. As a result, increased longevity would result in a longer period in poverty for those at the bottom

deciles in most countries. Dependence on minimum pensions would also increase, particularly among women.

There is a similar overall picture with regards to the impact on the strength of the consumption smoothing function. However since the loss induced by reforms in replacement rates is generally stronger than that in achievable poverty thresholds, the effect of longer longevity is slightly less pronounced.

*Table 9.8: The overall replacement ratio achievable in 2005 and change in percentage points (p.p.) by 2050 under different longevity at retirement assumptions**
*a) Men^*

	2005 (%)	**Longevity as in Ch8 (p.p.)**	**Longevity 2 years more than Ch8 (p.p.)**
Austria	89	-23	-25
Finland	59	0	-1
France	56	+2	+1
Germany	71	-2	-2
Hungary	74	-12	-12
Italy	92	-33	-34
Poland	67	-11	-12
Slovakia	62	-6	-6
Sweden	66	-7	-8
UK	37	+16	+15

*b) Women^*

	2005 (%)	**Longevity as in Ch8 (p.p.)**	**Longevity 2 years more than Ch8 (p.p.)**
Austria	75	-9	-11
Finland	58	+2	+1
France	41	+10	+9
Germany	59	+8	+8
Hungary	74	-10	-10
Italy	65	-15	-16
Poland	65	-22	-23
Slovakia	75	-19	-19
Sweden	66	-9	-10
UK	40	+17	+16

** This is the replacement rate in terms of pre-retirement income throughout retirement which net pension wealth at pension age could finance.*
^ These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.
Source: Own analysis using APEX.

Thus it seems that higher-than-expected longevity should not result in substantial changes in the degree of system goal achievements. However longer lives put significant

pressures on system constraints. As can be seen in Table 9.9, the relative size of pension transfers to the 2050 pensioner generation rises significantly, notably in Hungary. In those countries where reforms lowered the size of net pension wealth of future generations, higher longevity would undo a lot of the effects of the reforms.

Table 9.9: The net pension wealth of the 2050 generation compared to that of the 2005 generation under different longevity at retirement assumptions (%)
*a) Men^*

	Longevity as in Ch8	**Longevity 2 years more than Ch8**
Austria	94	104
Finland	125	137
France	101	110
Germany	104	118
Hungary	116	133
Italy	77	87
Poland	83	92
Slovakia	80	91
Sweden	112	121
UK	127	141

*b) Women^*

	Longevity as in Ch8	**Longevity 2 years more than Ch8**
Austria	87	92
Finland	119	124
France	141	146
Germany	124	128
Hungary	82	104
Italy	76	89
Poland	73	78
Slovakia	58	68
Sweden	96	100
UK	117	122

^ *These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.*
Source: Own analysis using APEX.

When looking at financial sustainability, these effects are complemented by the fact that higher longevity worsens the system dependency ratio. Table 9.10 presents an estimate of the increase in the long-term contribution rates induced by a 2 year higher longevity improvement. On average across all countries, the contribution rate would need to rise by an additional 1.5 percentage points, quite an increase in the absence of any improvement in the

achievement of system goals. The worst hit would be the Eastern European countries, with Hungary requiring a further increase of 6 percentage points, while Poland and Slovakia would need to raise contributions by an additional 3 percentage points. Italy and the UK, by contrast, would require an additional rise of less than one percentage point. One needs to keep in mind that an unanticipated rise in longevity would pose financing issues also to NDC systems as the initial pension level would be set in terms of the expected longevity of the cohort. However these systems have automatic adjustments which would lessen this impact over time.[188]

*Table 9.10: Long-term contribution rates (% of lifetime wages) in 2005 and change in percentage points (p.p.) by 2050 under different longevity assumptions**

	2005 (%)	**Longevity as in Ch8 (p.p.)**	**Longevity 2 years more than Ch8(p.p.)**
Austria	19.3	+7.5	+8.6
Finland	8.7	+12.2	+13.6
France	21.0	+20.4	+21.9
Germany	11.8	+9.1	+10.6
Hungary	37.7	+6.8	+13.3
Italy	29.7	+1.9	+2.5
Poland	14.4	+20.3	+23.7
Slovakia	20.6	+18.1	+20.9
Sweden	11.5	+10.0	+11.3
UK	9.1	+1.2	+1.5

** This gives the proportion of total lifetime wages needed to finance the net pension wealth of different pensioner generations.*

Source: Own workings using APEX, labour market participation projections and Eurostat population projections.

To sum up, the estimates presented in this section indicate that unexpected longevity improvements would result in substantial pressures on system constraints, while leaving the achievement of system objectives relatively unaffected. This suggests that the best reaction to longevity improvements lies in raising labour market participation in line. Longer working lives would reduce the increase in pension wealth requirements due to higher longevity and also generate the resources to finance them. Given the repeated revisions of longevity projections, this implies that policymakers need to either set up automatic mechanisms to adjust the pension system in line with longevity or else to repeatedly reconsider elements of the pension arrangement – notably the pension age. While having automatic mechanisms may facilitate implementing changes, there is, however, the risk that the system will be harder to

[188] Our analysis has ignored the presence of automatic balancing mechanisms, such as those in Sweden and Germany. These result in a reassessment of benefit levels in reaction to changes in system dependency ratios. The operation of these mechanisms is difficult to model precisely, but they would result in less generous benefits and lower financing needs.

understand and that unannounced changes in entitlement conditions will not be accompanied by the appropriate labour market reactions. Ad-hoc periodic reforms, though politically more difficult and harder to sustain over the long-term, might, conversely, be more visible and result in desired labour participation responses.

9.3 Contribution credits for childcare and unemployment

In Chapter 8 we moved away from the standard full-career comparisons and adjusted the social sustainability indicators for actual and projected labour market participation. This was done by assuming that contribution histories could be approximated by the labour market activity rates of a generation of working-age individuals. Aside from the "data-induced" issues with this approach mentioned in Chapter 8,[189] there are two "rules-induced" issues. Our approach has implicitly assumed that unemployment does not result in losses in pension entitlement. Moreover our approach has ignored whether pension rights accrual is protected through contribution credits for periods spent out of the formal labour market to provide care.

Table 9.11 shows that unemployment rates are significantly high in some countries, particularly between the ages of 15 and 24 (e.g. over a quarter of young Poles were unemployed in 2005). Women tend to have higher unemployment rates during the peak working age (25-49). Unemployment rates decline after age 50, as older unemployed individuals tend to become inactive. Taken as a whole, there is a significant difference in unemployment levels among the ten countries, with the overall unemployment rate in the UK being 3 times lower that in Poland and Slovakia.

Table 9.11: Unemployment rate (% of the active population) by age and gender-2005

	Men			**Women**		
	15-24	**25-49**	**50-64**	**15-24**	**25-49**	**50-64**
Austria	10.7	4.0	3.8	9.9	5.0	3.5
Finland	20.6	6.6	6.7	19.5	7.2	6.9
France	19.1	7.0	5.5	21.5	9.3	6.3
Germany	16.8	10.4	12.0	13.9	9.8	12.0
Hungary	19.6	6.3	4.5	19.0	7.1	4.6
Italy	21.5	5.4	3.3	27.4	9.5	4.0
Poland	35.7	14.2	13.8	38.3	17.8	13.1
Slovakia	31.0	13.4	12.7	28.8	16.0	14.4
Sweden	23.3	6.6	5.0	22.4	6.8	3.5
UK	14.3	3.6	3.4	11.0	3.4	2.2

Source: Eurostat LFS.

[189] We are imposing the average labour participation of a cross-section of generations on a single generation (problematic if activity rates have been changing). We are also assuming that all individuals display the average participation trend over their career (no socioeconomic differences in activity).

While women tend to have higher unemployment than men, this is not the primary determinant for their low activity rate. On average, women have an inactivity rate which is nearly double that of men, with the exception of Scandinavian countries, where the gender gap in inactivity is closer to a third, and to a lesser extent Eastern European countries (gap is close to two-thirds). A big cause of this gap tends to be the unequal division of caring responsibilities in families. Table 9.12 presents data from Eurostat's Labour Force Survey (LFS) on the proportion of the inactive who attributed their inactivity to caring responsibilities. Of all men aged 25-64 who were inactive in 2001, on average, only 3% declared they were inactive because they had caring responsibilities, as against over a third of women.

Table 9.12: Proportion of inactive population (%) by age and gender who attributed inactivity to caring responsibilities - 2001

	Men			**Women**		
	15-24	**25-49**	**50-64**	**15-24**	**25-49**	**50-64**
Austria	NA	NA	0.8	4.2	69.9	21.4
Finland	NA	NA	NA	11.3	53.5	4.8
France	0.2	3.3	NA	0.8	24.7	1.8
Germany	1.2	5.2	0.5	8.3	68.0	18.9
Hungary	NA	3.8	0.6	10.5	41.7	2.5
Italy	1.5	6.6	1.7	7.9	77.7	51.0
Poland	NA	1.9	0.6	7.6	59.4	9.7
Slovakia	NA	NA	NA	13.3	64.1	1.3
Sweden	11.1	11.4	12.0	15.1	31.1	24.4
UK	NA	13.3	4.5	27.5	65.6	18.6

Note: NA stands for not available. Eurostat deem these data not to be reliable.
Source: Eurostat LFS.

There are very pronounced cross-country differences in care responsibilities undertaken by women. These tend to be lowest in Sweden and France and highest in Italy, Germany and Austria. Interestingly men in Sweden (and to a lesser extent the UK) report having a considerable family caring role. After age 49, inactivity due to caring tends to decline significantly in most countries (except in Italy and Sweden).

The impact on pension entitlements of unemployment or periods spent outside the workforce because of caring responsibilities varies across countries.[190] The particular pension scheme details can be accessed from MISSOC and are modelled in APEX. Recently there have been reviews of the impact that childbearing can have on the pension entitlements of women in EU countries, such as Kotowska et al (2008). ISG (2009) also looked on a cross-

[190] Monticone et al (2008) describes in some depth the entitlement rules affecting women in EU countries. For an example of an in-depth country study, see DWP (2005).

country basis at the impact unemployment can have on pension entitlements. In this section we will use the ISG (2009) simulations on the impact on theoretical replacement rates of periods of childcare and of unemployment to modify our social sustainability indicators.[191] This choice is motivated by the fact that the ISG study utilised APEX and the definition of their full-time base case is the same as the one adopted in Chapter 6.

Table 9.13 shows the change in the net replacement rate from state pensions for a woman, earning the average wage and with an otherwise full contributory record, who spends some years caring. The first thing to note is that the pension systems of France, Germany and Italy boost pension generosity for women with children, even if they do not leave the labour force. By contrast, Eastern European countries do not appear to have significant contribution credits. Interestingly only the French system rewards women for periods of more than 2 years of childcare, while in Austria, Finland, Germany and Italy there is a significant disincentive for women to carry on caring responsibilities beyond 2 years.

Table 9.13: Percentage point change in state pensions net replacement rate for full-career woman on average wages by number of years spent in childcare

	One child and 0 years spent caring	**One child and 1 year spent caring**	**One child and 2 years spent caring**	**One child and 3 years spent caring**
Austria	0.0	+2.5	+0.8	-1.0
Finland	0.0	+0.3	+0.5	-0.5
France	+1.3	+1.0	+0.4	+0.2
Germany	+1.4	+0.6	-0.1	-0.8
Hungary	0.0	-1.0	-2.0	-3.0
Italy	+0.5	+0.4	+0.4	-0.9
Poland	0.0	-1.0	-2.1	-3.1
Slovakia	0.0	-0.5	-1.0	-1.5
Sweden	0.0	-0.2	-0.4	-0.5
UK	0.0	-0.1	-0.2	-0.2

Source: Adapted from ISG (2009).

ISG (2009) reports that "in most countries unemployment results in a loss of pension entitlements", though in most cases, the drop is small due to "considerable protection of pension entitlements in the unemployment benefit system in most Member States". Table 9.14 shows the change in the net replacement rate from state pensions due to unemployment for an average earner with an otherwise full career. The decline tends to be low during the first year of unemployment, except in Slovakia, Finland and Poland. However as ISG (2009) reports

[191] Women are also heavily engaged in care for the elderly. This aspect is not studied here. In some countries care of all dependents is treated equally. Kotsadam (2009) provides a cross-country review of the impact of eldercare on labour participation, finding strong effects for women in Southern Europe.

"the decrease in replacement rates due to breaks in the career due to unemployment increases and often at an increasing rate the longer the individual is away from the labour market".

Table 9.14: Percentage point change in state pensions net replacement rate for full-career man on average wages by number of years spent unemployed

	1 year in unemployment	**2 years in unemployment**	**3 years in unemployment**
Austria	-0.6	-1.3	-2.0
Finland	-2.8	-5.4	-6.0
France	-0.1	-0.2	-0.3
Germany	-0.2	-0.4	-0.9
Hungary	-0.5	-1.0	-1.5
Italy	0.0	-1.5	-3.0
Poland	-1.0	-2.4	-3.7
Slovakia	-2.2	-4.3	-6.3
Sweden	-0.3	-0.9	-1.5
UK	-0.3	-0.5	-0.7

Source: Adapted from ISG (2009).

Given the above, the assumption taken in Chapter 8 that unemployed periods are equivalent in pension accrual terms to employed periods overestimates pension wealth particularly in Poland and Slovakia, where one-seventh and one-sixth, respectively, of the male active population is unemployed (and mostly for more than a year – see Table 9.15). Moreover in France and Italy where there are pronounced gender differences in unemployment, ignoring the latter's impact may underestimate the gender pension gap. Conversely, the approach taken that periods spent inactive due to childcare do not accrue entitlements underestimates generosity, particularly in Austria, France and Germany.

Table 9.15: Percentage of the unemployed (aged 15-64, both genders) by duration of unemployment spell in 2005 (% of total)

	1 year or less	**Between 1 and 2 years**	**More than 2 years**
Austria	75	12	13
Finland	74	13	12
France	59	20	21
Germany	47	19	34
Hungary	55	24	21
Italy	52	18	30
Poland	42	28	30
Slovakia	28	21	51
Sweden	89	7	4
UK	79	11	10

Source: Eurostat LFS.

Since our analysis is based on the impact of reforms on hypothetical individuals, it is difficult to make a straightforward adjustment to incorporate the possibility of these

individuals being unemployed or having children. We again have to resort to assumptions. In respect of childcare, we assume that all our hypothetical women have children and care for each child for 2 years. The number of children they are assumed to have is determined by the national fertility rate used in Eurostat's population projections.[192] As for unemployment, we base our assumptions on duration of unemployment data from Eurostat's LFS. This suggests that in Austria, Finland, Sweden and the UK most unemployed spend 1 year or less out of work (therefore we assume our individuals are unemployed for 1 year). By contrast in Slovakia, unemployment spells last for more than 2 years (so we assume our individuals spend 3 years unemployed). For the other countries, we assumed a 2-year unemployment break. In practice these assumptions mean that women accrue up to 4 years of credits for childcare, but lose some entitlement due to unemployment; while men lose part of their entitlement due to unemployment. As noted in the introduction to this Chapter, we do not have complete details of pre-reform contribution credits in all countries. We will thus be adjusting the results for 2005 and 2050 in line with current crediting arrangements.

Table 9.16 shows the poverty threshold which could be financed by the net pension wealth at retirement, using the approach taken in Chapter 8 and the adjustment for periods spend in unemployment or childcare. Taking an average, weighted by relative population size, across the ten countries, the new estimates show that in 2005 pension systems offer a threshold of 66% instead of 67% for men, and 55% instead of 52% for women, implying a smaller pension gender gap. The unemployment assumption lowers state pension generosity for men, with the strongest losses in Slovakia and Finland. By contrast in the UK, Sweden and France the decline is marginal. The compounding of the unemployment and childcare effects reduces generosity for women in the Eastern European countries studied. Conversely the pension wealth of women in Austria, Germany and France can sustain a higher poverty threshold.

Looking forwards to 2050, the unemployment assumption does not change much the magnitude of the projected impacts for men. By contrast, there are considerable differences for women. In some cases, such as France and Germany, generosity is not set to improve that much. In these countries, the forecast increase in female labour participation was projected to increase the effective generosity of the system, but once childcare assumptions are taken into account, this effect becomes less strong as inactivity bears down less strongly on generosity. Conversely, in countries where pension reforms have linked more benefits to contributions, one has the opposite effect. For instance in the NDC systems of Italy and Sweden, the fact

[192] These range from 2 for women in France to 1.3 for women in Slovakia.

that women now contribute for more years than was assumed in Chapter 8 means that they face better prospects after the reforms. The only NDC country where the change in generosity by 2050 is worse for women is Poland (but this reflects the high penalty on unemployment).

*Table 9.16: The poverty thresholds achievable in 2005 and 2050 taking into account credits for unemployment and childcare**

a) Men ^

	2005 (%)		2050 (%)		Change 2050-2005 (percentage points)	
	Chapter 8	**Incl credits**	**Chapter 8**	**Incl credits**	**Chapter 8**	**Incl credits**
Austria	95	94	74	73	-21	-21
Finland	64	60	66	62	+2	+2
France	63	63	59	59	-4	-4
Germany	61	60	59	58	-2	-2
Hungary	70	69	65	64	-5	-5
Italy	95	93	68	66	-27	-27
Poland	66	63	50	48	-16	-16
Slovakia	93	83	51	44	-42	-39
Sweden	70	70	65	65	-5	-5
UK	46	46	59	59	+13	+13

b) Women ^

	2005 (%)		2050 (%)		Change 2050-2005 (percentage points)	
	Chapter 8	**Incl credits**	**Chapter 8**	**Incl credits**	**Chapter 8**	**Incl credits**
Austria	68	72	61	65	-7	-7
Finland	57	57	58	59	+1	+2
France	44	55	59	64	+15	+10
Germany	48	51	56	56	+8	+5
Hungary	68	65	59	59	-9	-6
Italy	68	69	50	52	-18	-17
Poland	55	53	35	32	-20	-21
Slovakia	74	69	41	42	-33	-27
Sweden	59	59	56	58	-3	-1
UK	39	41	56	58	+17	+17

** This represents the poverty threshold (defined as a % of median disposable income) throughout retirement which net pension wealth at pension age could finance.*

^ These indicators are the weighted averages for 4 hypothetical actual-careers full-timers with below-median wages and the hypothetical part-timer. Weights reflect the share of full- and part-time workers.

Source: Own analysis using APEX.

The impact of these modelling adjustments on consumption smoothing is similar. Table 9.17 shows the Chapter 8 estimates of the replacement rate financed by net pension wealth and revised figures taking into account periods in unemployment and providing childcare. On average, across the ten countries, the replacement rate for men in 2005 is one

percentage point lower than shown in Chapter 8 (64% instead of 65%), whereas that for women is nearly two percentage points higher (57% instead of 55%). By 2050, the relative strength of this effect for women drops significantly, as higher labour participation increases the influence of the unemployment effect on pension entitlements. For men the effect remains constant through time. Similarly to what happens to poverty thresholds, one finds that contribution credits tend to reduce the impact of the reform on women in Sweden, Slovakia and Italy, while women in France and Germany gain less from the projected increase in their participation rates.

*Table 9.17: The overall replacement ratio achievable in 2005 and 2050 taking into account credits for unemployment and childcare**
a) Men ^

	2005 (%)		**2050 (%)**		**Change 2050-2005 (percentage points)**	
	Chapter 8	**Incl credits**	**Chapter 8**	**Incl credits**	**Chapter 8**	**Incl credits**
Austria	89	88	66	65	-23	-23
Finland	59	55	59	56	0	+1
France	56	56	58	58	+2	+2
Germany	71	70	69	68	-2	-2
Hungary	74	73	62	61	-12	-12
Italy	92	90	67	65	-33	-25
Poland	67	65	56	54	-11	-11
Slovakia	62	55	56	49	-6	-6
Sweden	66	66	59	59	-7	-7
UK	37	37	53	53	+16	+16

b) Women ^

	2005 (%)		**2050 (%)**		**Change 2050-2005 (percentage points)**	
	Chapter 8	**Incl credits**	**Chapter 8**	**Incl credits**	**Chapter 8**	**Incl credits**
Austria	75	80	66	70	-9	-9
Finland	58	58	60	61	+2	+3
France	41	48	51	54	+10	+5
Germany	59	62	67	67	+8	+5
Hungary	74	70	64	64	-10	-6
Italy	65	66	50	52	-15	-14
Poland	65	63	43	39	-22	-24
Slovakia	75	69	56	55	-19	-14
Sweden	66	64	57	58	-9	-6
UK	40	41	57	58	+17	+17

** This represents the replacement rate (defined in terms of pre-retirement income) throughout retirement which net pension wealth at pension age could finance.*
^ These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the share of full- and part-time workforce in each country.
Source: Own analysis using APEX.

Table 9.18 compares the net pension wealth of the 2050 generation with that of the generation retiring in 2005, taking into account contribution credits. On average, across all countries there is little change for men, but the improvement in net pension wealth for women decreases when one takes into account credits. This follows from the fact that the inclusion of contribution credits boosts the net pension wealth of women in 2005 more considerably than in 2050, as systems were generally more generous. This effect is mostly felt in Germany, France and Poland. By contrast, the inclusion of childcare credits improves the position of women in 2050 in Sweden, Slovakia and Hungary.

Table 9.18: The net pension wealth of the 2050 generation compared to that of the 2005 generation taking into account credits for unemployment and childcare (%)
*a) Men^*

	Chapter 8	**Incl credits**
Austria	94	94
Finland	125	127
France	101	101
Germany	104	104
Hungary	116	116
Italy	77	77
Poland	83	82
Slovakia	80	78
Sweden	112	112
UK	127	127

*b) Women^*

	Chapter 8	**Incl credits**
Austria	87	86
Finland	119	120
France	141	127
Germany	124	117
Hungary	82	85
Italy	76	77
Poland	73	69
Slovakia	58	61
Sweden	96	101
UK	117	116

^ *These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.*
Source: Own analysis using APEX.

Having seen that taking into account contribution credits improves significantly the generosity of pension systems to women, but marginally lowers that for men, it comes to no

surprise that the contribution rates needed to finance pension transfers are higher than originally estimated (see Table 9.19). In Chapter 8, on average across all countries, the required contribution rate in 2005 was estimated at 17%, but our adjustment for contribution credits raises this to 19%. There are some interesting differences in the impact of contribution credits, with the cost of the system dropping or remaining stable in Finland, Hungary, Italy and Slovakia while there are significant upward revisions in the cost of the French, German, Polish, Swedish and UK systems. This reflects the relative importance of the unemployment penalty compared to the childcare gain (e.g. in countries with low female labour participation the unemployment effect is stronger) and the current degree of progressiveness (as women on low incomes tend to gain a lot by having contribution credits).

*Table 9.19: Evolution of long-term contribution rates (% of lifetime wages) over time taking into account credits for unemployment and childcare**

	2005		**2050**		**Change 2050-2005 (percentage points)**	
	Chapter 8	**Incl credits**	**Chapter 8**	**Incl credits**	**Chapter 8**	**Incl credits**
Austria	19.3	19.8	26.8	27.6	+7.5	+7.8
Finland	8.7	8.8	20.9	21.2	+12.2	+12.4
France	21.0	23.4	41.4	46.8	+20.4	+23.5
Germany	11.8	14.0	20.9	26.0	+9.1	+12.0
Hungary	37.7	37.0	44.5	44.1	+6.8	+7.1
Italy	29.7	29.7	31.6	31.7	+1.9	+2.0
Poland	14.4	15.9	34.7	37.8	+20.3	+21.9
Slovakia	20.6	19.2	38.7	36.6	+18.1	+17.4
Sweden	11.5	13.0	21.5	26.2	+10.0	+13.2
UK	9.1	10.8	10.3	12.6	+1.2	+1.8

** This gives the proportion of total lifetime wages needed to finance the net pension wealth of different pensioner generations.*

Source: Own workings using APEX, labour market participation projections and Eurostat population projections.

Chapter 8 suggested that the required contribution rate would rise by nearly 10 percentage points by 2050. The modelling adjustments made here imply a stronger rise, of 11.5 percentage points. Countries with generous crediting provisions face significantly higher costs, with France, Germany and Sweden, particularly affected.

In conclusion, this attempt to model in a more sophisticated way the possible impact of contribution credits for unemployment and childcare has suggested that, on the basis of the assumptions made, pension systems might be less generous than previously estimated for men and conversely for women. The impact on pension system constraints is more mixed. On the one hand, the increase in the relative size of pension transfers to future generations is reduced

slightly (as the size of current transfers is revised upwards). On the other, the required rise in contribution rates is higher as pension entitlements increase without any rise in labour market activity.

Finally it is important to stress the limits of this exercise. What has been done here is only a pale shadow of what could be achieved through dynamic microsimulation. Looking at a limited number of hypothetical individuals has its advantages, as it makes interpretation of results easier and impacts of reforms more understandable. However it is very difficult to make realistic assumptions about life-course events like unemployment or childcare. In this section a number of simplifying assumptions were taken. Estimates should therefore be, in the main, used to benchmark the results of Chapter 8 and give some indication of the potential revisions that could be made.

9.4 The impact of different assumptions on growth in macroeconomic variables

In the first two sections of this Chapter we simulated the impact on the social sustainability indicators of a change in the employment and longevity assumptions – two very important determinants of the strength of pension entitlements. However the latter also depend on several macroeconomic variables. In this section we will be looking at some of them, but as pointed out earlier, we will be carrying out simulations for only a sub-set of systems. In the case of wage growth, 5 countries – France, Italy, Poland, Sweden and the UK – were selected. These are broadly representative of the taxonomy developed in Chapter 2,[193] and the impact of different wage assumptions is similar across systems of the same typology. In the second part of this section we will look at the impact of different interest rate and GDP growth assumptions on the NDC/personal pension systems of Italy, Sweden and Poland.

9.41. The impact of different wage growth assumptions

One would expect, a priori, that wage growth is a very important determinant of pension entitlements, particularly in countries with high replacement rates. Faster wage growth would result in higher pensions. However the social sustainability indicators are all defined in relative wage terms. Thus while faster wage growth may lead to higher nominal pension levels, particularly in countries with a strong earnings link, the starting pension level would be the same percentage of the contemporary wage as before.

[193] This had 4 main groups. France and Poland were classed among countries with high replacement and low poverty. The UK and Italy both have low replacement and high poverty; but Italy has high spending. Sweden was among countries with low spending, low replacement and low poverty.

For instance, the poverty threshold adopted is not based on some nominal absolute value, but as a percentage of the national average wage. Different wage growth does not change the earnings relative value of the pension entitlements required to meet this poverty threshold. This reasoning applies to the other 3 indicators. The only reason why different wage growth assumptions could affect the build-up of pension entitlements is the presence of system parameters which are not uprated with nominal wage growth. Thus, for example, if there is a maximum pensionable income which is uprated in line with prices, having a higher wage growth assumption would result in entitlements hitting the maximum earlier (and thereby decreasing the achievement of system goals). These elements tend to be quite rare in practice.

More important, however, is what happens to the relative earnings value of pension entitlements after retirement. In most countries, pension benefits are no longer, or were never, uprated in line with wages, as was documented in Chapter 3. Table 9.20 taken from ISG (2009) provides details on the uprating arrangements expected to be in force by 2046 across the ten countries and shows that full wage indexation is only expected in Germany.[194] The relative strength of benefits decreases significantly over time if they are not uprated in line with earnings. This negative impact increases the longer the period spent in receipt of this benefit and the faster the pace of wage growth relative to the uprating factor applied.[195]

Table 9.20: Indexation of pension benefits in the different components of pension systems in 2046

	Minimum pension	**Other state pension**
Austria	Prices	Prices
Finland	Prices	20% wages
France	Prices	Prices
Germany	Wages	Wages
Hungary	50% wages	50% wages
Italy	Prices	Prices
Poland	Prices	Prices
Slovakia	50% wages	50% wages
Sweden	Prices	Wages - 1.6%
UK	Wages	Wages*

** State Second Pension is uprated with prices*

Source: Adapted from ISG (2009).

[194] However in Germany benefit levels will be affected by the so-called sustainability factor (based on changes in the dependency ratio).

[195] See for example, Sutherland et al (2009).

Thus, one would expect that higher wage growth should have a negative impact on the achievement of system aims. If wage growth is higher than assumed in Chapter 8, the poverty threshold that needs to be met by pension entitlements grows faster than the pension entitlements themselves. Similarly for the strength of the consumption smoothing function, if wages grow faster than previously assumed, replacement rates decline over the retirement period at a quicker pace than shown in Chapter 8.

Table 9.21 shows the effect on change in the poverty threshold achievable, on average, in 2050 under different wage growth assumptions. The first and second columns reproduce the results presented in Chapter 8 where a nominal wage growth rate of 4.5% was assumed. The third and fourth columns, by contrast, show the change if one assumes 3% and 5.5% nominal wage growth, respectively.

*Table 9.21: The poverty thresholds achievable in 2005 and change in percentage points (p.p.) by 2050 under different wage growth assumptions**
*a) Men^*

	2005 (%)	**Wage growth as in Ch8-4.5% (p.p.)**	**Wage growth 1.5 p.p. less-3% (p.p.)**	**Wage growth 1.0 p.p. more-5.5% (p.p.)**
France	63	-4	-1	-7
Italy	95	-27	-12	-34
Poland	66	-16	-4	-20
Sweden	70	-5	-2	-5
UK	46	+13	+15	+12

*b) Women^*

	2005 (%)	**Wage growth as in Ch8-4.5% (p.p.)**	**Wage growth 1.5 p.p. less-3% (p.p.)**	**Wage growth 1.0 p.p. more-5.5% (p.p.)**
France	44	+15	+19	+16
Italy	68	-18	-4	-20
Poland	55	-20	-14	-21
Sweden	59	-3	-1	-3
UK	39	+17	+18	+17

** This represents the poverty threshold (defined as a % of median disposable income) throughout retirement which net pension wealth at pension age could finance.*
^ These indicators are the weighted averages for 4 hypothetical actual-careers full-timers with below-median wages and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.
Source: Own analysis using APEX.

As anticipated, higher wage growth results in the system being less effective in tackling post-retirement poverty. For example, in Poland if wage growth is 1 percentage point

higher, the poverty threshold achieved, on average, by men would decline by 20 percentage points, rather than by 16 percentage points. By contrast, the decline for women grows only slightly to 21 percentage points, instead of 20 percentage points. This might strike one as being a counter-intuitive result, as surely if pension indexation is the same for both genders, the impact of higher wage growth should be the same. However one needs to keep in mind that the entitlements of women are lower than those of men, and so the relative loss if these entitlements lose value is smaller. Higher wage growth results in less women being dependent on the minimum pension, as they manage to build up higher pension entitlements. Since the minimum pension in most countries has less generous indexation (see Table 9.20), higher wage growth is beneficial to women.[196]

The interpretation of the results of the simulation for lower wage growth is more straightforward. Lower wage growth results in pension benefits maintaining their value relative to average wages better during the post-retirement period. From Table 9.21 one can note that the change induced by different wage assumptions is least strong in the UK and in Sweden, reflecting the fact that they have the most generous post-retirement indexation regimes among the 5 countries.

Table 9.22 presents the impact on consumption smoothing, by comparing the change in the replacement rate which would, on average, be achieved post-retirement in 2050. The trends are very similar to those described for poverty alleviation. Pensioners in Sweden and the UK are the best-protected post-retirement. On average, pensioners are better off if wage growth is low. It is important to note, though, that we are assuming constant wage growth rates during the entire simulation period. Thus the wage growth faced by individuals when they were of working age is the same that is observed while they are of pension age. One would have very different results if one assumes breaks in wage growth rates. Individuals are inevitably worse off if the wage growth they experience during their working age is lower than that occurring during their retirement years, and vice versa. For instance, pensioners in many Eastern European countries ended up being much better off, relatively speaking, in retirement than one would have anticipated, as wages dropped significantly post-transition.

[196] In the UK one does not find this effect, as the minimum pension is indexed to wages.

*Table 9.22: The overall replacement ratio achievable in 2005 and change in percentage points (p.p.) by 2050 under different wage growth assumptions**
*a) Men^*

	2005 (%)	**Wage growth as in Ch8-4.5% (p.p.)**	**Wage growth 1.5 p.p. less-3% (p.p.)**	**Wage growth 1.0 p.p. more-5.5% (p.p.)**
France	56	+2	+5	0
Italy	92	-25	-14	-31
Poland	67	-11	-1	-14
Sweden	66	-7	-5	-7
UK	37	+16	+18	+15

*b) Women^*

	2005 (%)	**Wage growth as in Ch8-4.5% (p.p.)**	**Wage growth 1.5 p.p. less-3% (p.p.)**	**Wage growth 1.0 p.p. more-5.5% (p.p.)**
France	41	+10	+14	+11
Italy	65	-15	-1	-17
Poland	65	-22	-15	-23
Sweden	66	-9	-7	-9
UK	40	+17	+18	+17

** This rate represents the replacement rate (defined in terms of pre-retirement income) throughout retirement which net pension wealth at pension age could finance.*
^ These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.
Source: Own analysis using APEX.

While the achievement of system objectives worsens with faster wage growth, pressure on constraints lessens. Table 9.23 compares the net pension wealth of the 2050 and 2005 generations under different assumptions. If wage growth is lower than assumed in Chapter 8, the net pension wealth at the point of retirement would be significantly higher, notably in Italy, Poland and France. This reflects the fact that in these countries cuts in generosity are quite strong for those on middle- to high-incomes. If wage growth is slower than expected, this results in the cuts in generosity not coming that much into effect. By contrast, with faster wage growth the pressure on intergenerational balance tends to decline. The effects are more strongly felt for men as they are in the income bands which are mostly affected by the reform cuts.

Table 9.23: The net pension wealth of the 2050 generation compared to that of the 2005 generation under different wage growth assumptions (%)
*a) Men^*

	Wage growth as in Ch8-4.5% (p.p.)	**Wage growth 1.5 p.p. less-3% (p.p.)**	**Wage growth 1.0 p.p. more-5.5% (p.p.)**
France	101	112	100
Italy	77	93	73
Poland	83	97	79
Sweden	112	116	111
UK	127	132	125

*b) Women^*

	Wage growth as in Ch8-4.5% (p.p.)	**Wage growth 1.5 p.p. less-3% (p.p.)**	**Wage growth 1.0 p.p. more-5.5% (p.p.)**
France	141	143	139
Italy	76	94	75
Poland	73	79	72
Sweden	96	98	95
UK	117	119	116

^ These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.
Source: Own analysis using APEX.

Turning to fiscal pressures, Table 9.24 shows that higher wage growth dampens the burden on future working generations in Italy and Poland. The effect in Sweden and the UK is marginal as pensions retain their relative value. Low wage growth results in a large increase in the contribution required, especially in Italy, Poland and France.

*Table 9.24: Long-term contribution rates (% of lifetime wages) in 2005 and change in percentage points (p.p.) by 2050 under the different wage growth assumptions**

	2005	**Wage growth as in Ch8-4.5% (p.p.)**	**Wage growth 1.5 p.p. less-3% (p.p.)**	**Wage growth 1.0 p.p. more-5.5% (p.p.)**
France	21.0	+20.4	+23.3	+20.1
Italy	29.7	+1.9	+7.7	-1.1
Poland	14.4	+20.3	+24.3	+19.4
Sweden	11.5	+10.0	+10.4	+9.8
UK	9.1	+1.2	+1.4	1.1

** This gives the proportion of total lifetime wages needed to finance the net pension wealth of different pensioner generations.*
Source: Own workings using APEX, labour market participation projections and Eurostat population projections.

9.42. The impact of different interest rate and GDP growth assumptions

Chapter 3 reviewed how some countries adopted NDC schemes where pension entitlements depend on accumulated contributions (and credits) and on the notional interest accorded them. The NDC systems of Poland and Sweden use wage growth to calculate this interest, while in Italy GDP growth is used. In section 9.41 we modelled the impact of different wage assumptions on pension entitlements in Poland and Sweden. However our pension wealth estimates for these two countries also include returns from mandatory personal pensions, which depend crucially on the assumed rate of return. In this section we move away from the OECD assumptions on real interest rates (3.5%) and real GDP growth (1.6%) adopted in other Chapters, in order to understand the impact of different GDP growth assumptions on the social sustainability indicators for Italy and of different interest rate assumptions on those for Sweden and Poland.[197] We simulate a one-percentage point deviation, upwards and downwards, from the OECD assumptions throughout the forecast period. One should note that interest rates in Sweden are lower than in Poland, and may remain so for some time in the future. No attempt was made in this exercise to simulate this country difference. Estimates here are meant to just give an idea of the potential impact of changes in assumptions and not provide definite predictions.

Table 9.25 shows the poverty threshold which net pension wealth in 2005 sustains, together with the change in percentage points by 2050 under different GDP growth and market interest rate assumptions. This suggests that a one-percentage point deviation in long-term GDP growth would have very strong implications for the poverty alleviation function in Italy. There are two interesting things to note. First, women are less affected then men as they have smaller pension entitlements to begin with. Second, the impact of lower GDP growth is slightly smaller than that of higher GDP growth. This reflects the fact that the NDC system is underpinned by a minimum pension system, which would sustain net pension wealth in periods of low accrual of NDC entitlements. The same impact is observed in respect of lower interest rate assumptions in Sweden and Poland. Lower interest rates decrease further poverty alleviation by 2050, and vice versa. However there is a significant difference in the size of this impact in both countries, as in Poland a larger component of pension entitlements depends on the income from personal accounts than in Sweden.

[197] Changes in GDP growth rates would also impact estimates in Sweden and Poland. However given our static modelling framework, it is not possible to calculate this impact, as we cannot impute the extent to which the change in GDP growth changes wage growth or interest rates.

*Table 9.25: The poverty thresholds achievable in 2005 and change in percentage points (p.p.) by 2050 under different interest rate and GDP growth assumptions**
*a) Men^*

	2005	3.5% Interest rate/1.6% GDP growth (Ch8)	4.5% Interest rate/2.5% GDP growth	2.5% Interest rate/0.5% GDP growth
Italy	95	-27	-15	-38
Poland	66	-16	-8	-21
Sweden	70	-5	-1	-8

*b) Women^*

	2005	3.5% Interest rate/1.6% GDP growth (Ch8)	4.5% Interest rate/2.5% GDP growth	2.5% Interest rate/0.5% GDP growth
Italy	68	-18	-7	-28
Poland	55	-20	-15	-23
Sweden	59	-3	0	-5

** This represents the poverty threshold (defined as a % of median disposable income) throughout retirement which net pension wealth at pension age could finance.*
^ These indicators are the weighted averages for 4 hypothetical actual-careers full-timers with below-median wages and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.
Source: Own analysis using APEX.

The same trends emerge when one looks at the impact of the different assumptions on consumption smoothing. To return to the point made earlier, the fact that interest rates in Poland are higher than in Sweden, one could argue that the estimates of the drop in generosity made in previous Chapters for Poland could be significantly over-stated.[198] However the Tables above indicate that even with higher interest rate assumptions, the reforms in Poland have had a significant gender impact, placing women more at-risk-of-poverty during retirement, unless their labour participation increases significantly (particularly at older ages).

*Table 9.26: The replacement ratio achievable in 2005 and change in percentage points (p.p.) by 2050 under different interest rate and GDP growth assumptions**
*a) Men^*

	2005	3.5% Interest rate/1.6% GDP growth (Ch8)	4.5% Interest rate/2.5% GDP growth	2.5% Interest rate/0.5% GDP growth
Italy	92	-25	-13	-35
Poland	67	-11	-3	-16
Sweden	66	-7	-4	-9

[198] The interest rate on a ten-year government bond in Poland was 1.5 percentage points higher than in Sweden in 2007, while the inflation rate was around a percentage point higher.

Table 9.26: The replacement ratio achievable in 2005 and change in percentage points (p.p.) by 2050 under different interest rate and GDP growth assumptions…cont..*
*b) Women^*

	2005	3.5% Interest rate/1.6% GDP growth (Ch8)	4.5% Interest rate/2.5% GDP growth	2.5% Interest rate/0.5% GDP growth
Italy	65	-15	-5	-24
Poland	65	-22	-17	-26
Sweden	66	-9	-6	-11

** This represents the replacement rate (defined in terms of pre-retirement income) throughout retirement which net pension wealth at pension age could finance.*
^ These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the share of full- and part-time workforce in each country.
Source: Own analysis using APEX.

Table 9.27 shows the impact of the different assumptions on the pension wealth for the 2050 pensioner generation. The first thing to note is the substantial change induced by GDP assumptions to future pension wealth in Italy. If GDP growth in Italy is lower than projected, the pension entitlements of future generations will fall very significantly, and vice versa. The impact of different interest rate assumptions for Sweden and Poland is less marked – reflecting the fact that net pension wealth in these countries is significantly lower than in Italy. The second thing to note is that there is a clear difference in the impact on gender pension gaps of different interest rate assumptions in Sweden and Poland. The greater dependence on personal accounts makes women in Poland more at risk of fluctuations in their pension wealth.

Table 9.27: The net pension wealth of the 2050 generation compared to that of the 2005 generation under different interest rate and GDP growth assumptions (%)
*a) Men^*

	3.5% Interest rate/1.6% GDP growth (Ch8)	4.5% Interest rate/2.5% GDP growth	2.5% Interest rate/0.5% GDP growth
Italy	77	90	65
Poland	83	96	75
Sweden	112	118	107

*b) Women^*

	3.5% Interest rate/1.6% GDP growth (Ch8)	4.5% Interest rate/2.5% GDP growth	2.5% Interest rate/0.5% GDP growth
Italy	76	90	63
Poland	73	82	67
Sweden	96	102	92

^ These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the share of full and part-time workforce in each country.
Source: Own analysis using APEX.

All this has implications for financial sustainability, as can be seen in Table 9.28. Some of the results may be counterintuitive. For instance, high GDP growth may result in greater fiscal pressures in Italy, as a direct result of the notional interest rate formula adopted by the Italian reformers. Note that this is only true if this GDP growth were not due to higher growth in the wage bill (as we have seen in the previous section that higher wage growth reduces fiscal pressures in Italy). The second interesting thing to note is that while claims on future workers are decreased if the pace of pension accrual is lower than expected, the drop will not be linear, as minimum pensions provide significant underpins to pension expenditure.

*Table 9.28: Long-term contribution rates (% of lifetime wages) in 2005 and change in percentage points (p.p.) by 2050 under different interest rate and GDP growth assumptions**

	2005	**3.5% Interest rate/1.6% GDP growth (Ch8)**	**4.5% Interest rate/2.5% GDP growth**	**2.5% Interest rate/0.5% GDP growth**
Italy	29.7	+1.9	+7.9	-3.2
Poland	14.4	+20.3	+24.5	+17.6
Sweden	11.5	+10.0	+11.2	+9.1

** This gives the proportion of total lifetime wages needed to finance the net pension wealth of different pensioner generations.*

Source: Own workings using APEX, labour market participation projections and Eurostat population projections.

9.5 The effect of socio-economic differences in mortality and labour participation

In Chapter 5 we argued that the best way to assess the sustainability of pension reforms is by means of pension wealth rather than replacement rates. We also argued that rather than looking at hypothetical individuals with full careers, one should look at individuals across the wage distribution and try to take into account labour market participation.

However our approach still remains a proxy. This is because the two main determinants of pension transfers – namely labour participation and longevity – are still assessed on an average basis, rather than on the socio-economic group being studied. To a large extent, this reflects the lack of adequate cross-country longitudinal data and harmonised socio-economic categories – a defect which surveys like EU-SILC and classification harmonisation projects like the European Socio-Economic Classification will help to gradually address. Yet, even within countries, it is not easy to determine from the same data source socio-economic differences in both labour market participation and longevity, as longitudinal studies frequently are not comprehensive enough or have not been in place long enough.

The presence of these data difficulties may excuse the lack of consideration given to socio-economic differences in previous Chapters. Nevertheless in view of the potentially large impact which they might have, it is appropriate to try to investigate the sensitivity of the social sustainability indicators to these differences. In this respect, the seminal paper by Whitehouse & Zaidi (2008) is very relevant, as it presents the OECD's assessment of the extent to which APEX estimates of pension wealth are affected by socio-economic differences in mortality. It points out, for example, that if those on low incomes die much younger than those on high incomes, assuming everyone has the same life expectancy overstates progressiveness.

Huisman et al. (2004) look at mortality differences by education level for those aged 50-90 in eleven European countries, including four on which our research has focused (see Table 9.29). These suggest that inequalities differ significantly across countries and patterns change also according to the age bracket being compared. Overall, Finland appears to have the smallest relative inequalities and Austria the highest.

*Table 9.29: Relative educational inequalities in mortality between men in the lower educated group and the combined middle and higher educated groups**

	50-59	**60-69**	**70-79**
Austria	1.86 (8.73)	1.56 (21.95)	1.39 (50.96)
England/Wales	1.36 (9.80)	1.61 (27.99)	1.17 (71.65)
Finland	1.49 (11.79)	1.41 (30.96)	1.25 (73.21)
France	1.58 (8.40)	1.31 (19.39)	1.36 (42.45)

** The figures in brackets represent the total rate, or the mortality rate of the total population in that age group (given per 1000 person years at risk). The relative risk ratio compares the mortality rate of the lower educated group with the rate of the combined middle and higher educated groups.*
Source: Huisman et al (2004).

Due to lack of data, Whitehouse & Zaidi (2008) look at three country-specific longitudinal household panel studies, covering the UK, Germany and the US, to determine the link between income and life expectancy. They find a gap in life expectancy at age 40 between the bottom-third and the top-third of the income distribution of 5 years in the UK and less than 4 years in Germany.

The pension wealth indicator shows in present value terms the total pension transfers expected during retirement. Instead of defining this in money terms, the transfers are defined in terms of the current average wage. The calculation of pension wealth thus involves two components – the annual payment in terms of the current average wage multiplied by a value that represents the expected duration of payment. The latter value, known as the annuity factor, gives the present value - in terms of the current average wage - of one payment paid for each of the years spent receiving the pension. If the discount rate were zero or pension

payments rose in line with the discount rate, and average wages remained stable or pension payments over time amounted to the same percentage of average wages, the annuity factor would be equivalent to life expectancy. However since the value of pension payments tends to decline relative to wages, the annuity factor is lower than life expectancy at pension age.

Table 9.30 shows the Whitehouse & Zaidi (2008) estimates of the annuity factors for men by tertiles of household income. This indicates that compared to the assessment made using the life tables for the average person, socio-economic differences in longevity mean that pensions are worth 5% less for the poor and 5% more for the rich. The differential for German men is less pronounced, with pensions being worth 3% less for the poor and 5% more for the rich. This suggests that the degree of pension system progressivity is in reality lower. The authors conclude that "socio-economic differences in mortality therefore suggest that lower-income workers should receive higher pension replacement rates than high earners to avoid the poor cross-subsidising the rich". Bismarkian and actuarially fair systems, like NDC schemes, may therefore be sub-optimal in social welfare terms, and vice versa for progressive systems.

Table 9.30: Annuity factors at age 65 for men by tertile of household income

	Low	**Middle**	**High**	**Average***
Germany	14.4	14.7	15.6	14.9
UK	11.9	12.5	13.2	12.5

** The "average" represents the annuity factor for the average person as presented in the standard life tables.*

Source: Whitehouse & Zaidi (2008).

The sustainability indicators do not simply look at the size of pension wealth. Rather they relate it to the transfers required to achieve set goals – e.g. keeping income above the poverty threshold. Thus if the poor live for less, their pension requirements are also lower. In fact, since pensions tend to lose over time their value relative to the poverty threshold or to previous lifetime wages, having lower life expectancy, by definition, makes systems more 'effective'. The rich, we have found, tend to be well-provided for in terms of the poverty alleviation function, though not so much in terms of consumption smoothing. Having longer life expectancies, a priori, would suggest a further weakening of the latter function.

Another issue, which is not studied in Whitehouse & Zaidi (2008) as they stick to full-careers, is the impact of socio-economic differences in the accrual of pension entitlements. Here comparative administrative data problems are currently insurmountable, but national data can be used to study differences in labour participation. Table 9.31, for instance, shows data on economic activity by age, gender and wealth quintile from the English Longitudinal Study of Ageing (ELSA)'s first wave. This suggests that those in the poorest wealth quintile remain

active for significantly less than those in the middle of the wealth distribution. Interestingly this seems to be the case also among the rich, though less so at advanced ages.

Table 9.31: Percentage economically inactive by age and wealth quintile - ELSA (%)

	50-54	**55-59**	**60-64**	**65-69**
Men (Total)	16.7	27.1	51.7	83.5
Poorest wealth quintile	44.1	49.6	67.6	91.4
Second wealth quintile	13.2	26.6	47.6	90.7
Middle wealth quintile	6.0	14.3	47.7	79.3
Fourth wealth quintile	10.0	20.8	51.1	83.6
Richest wealth quintile	15.7	25.6	44.9	72.8

Source: Banks & Casanova (2004).

In Chapter 8, using the labour participation rates from the LFS, we suggested that men, on average, in the UK accrue entitlements till the age of 58. Using the socio-economic differences implied by ELSA data, and calibrating average labour participation in ELSA to that in the LFS, one could conclude that the average age of exit for the bottom tertile of the wealth distribution lies somewhere around 54, while that for the middle tertile and top tertile is close to 60 and 59, respectively.[199]

On the basis of these assumptions about socio-economic differences in labour participation, together with the annuity factors by tertile computed by Whitehouse & Zaidi (2008), one can compute revised measures of net pension wealth for men of pension age in 2005 in the UK. We have formed the income tertiles as: the bottom income tertile - those at the bottom three deciles of the full-time workforce, the middle tertile - those in part-time employment and those at the fourth and fifth deciles of the full-time workforce, the top tertile - those at the sixth to the ninth decile of the full-time workforce.

Table 9.32 presents revised indicators for the current entitlements of men of state pension age in the UK taking into account different assumptions on labour participation and longevity post-pension age. The bottom tertile is assumed to accumulate entitlement till age 54 and lives nearly three years less post-retirement than the middle tertile. This results in net pension wealth at pension age amounting to just 3.1 years worth of the average wage. This is enough to purchase an annuity equivalent to a poverty threshold of 39% and a replacement rate of 56% till death. Due to the flat rate nature of the UK system, the replacement rates achieved by those in the middle and top tertiles lie far below this, but the strength of the poverty alleviation function for them is significantly stronger.

[199] The average age of exit for each tertile was determined as that age where more than 50% of that group are no longer economically active. The average of the three exit ages was set to equal that shown by the LFS.

Table 9.32: Revised indicators for the current UK pension system taking into account different assumptions on labour market participation and longevity of men

	Net pension level	**Annuity factor**	**Net pension wealth**	**Poverty threshold***	**Overall replacement rate^**
Bottom tertile	25.8	11.9	3.1	39%	56%
Middle tertile	31.4	12.5	3.9	47%	38%
Top tertile	37.0	13.2	4.9	54%	26%

** This represents the poverty threshold (defined as a % of median disposable income) throughout retirement which net pension wealth at pension age could finance.*
^ This overall replacement rate represents the replacement rate (defined in terms of pre-retirement income) throughout retirement which net pension wealth at pension age could finance.
Source: Own analysis using APEX.

Comparing these new estimates of net pension wealth with those made in Chapter 8, as is done in Table 9.33, one finds that the bottom tertile accrue significantly less pension entitlements than originally thought. However, those in the middle and top tertiles do not accrue considerably more than before. This reflects the fact that the UK pension system is not very earnings-related, thus lengthier periods of contributions do not result in significant increases in the level of state pensions. Moreover the pre-reform UK pension system was entirely price-uprated, and so assuming lengthier periods of retirement results in a relative stronger weakening of the value of pensions relative to the average wage.

Table 9.33: Net pension wealth in 2005 using different mortality and labour market participation assumptions

	Different mortality & labour market participation	**Same mortality & labour market participation**
Bottom tertile	3.1	3.5
Middle tertile	3.9	3.8
Top tertile	4.9	4.8

Note: Net pension wealth is defined in terms of multiples of the net average wage at pension age.
Source: Own analysis using APEX.

Table 9.34 compares the estimates of the strength of the poverty alleviation and consumption smoothing functions under the two sets of assumptions on labour market participation and longevity. This is done by looking at the variation in the poverty threshold and in the overall replacement rate which the different estimates of net pension wealth imply. This shows that the estimates made in Chapter 8 over-estimated the strength of these functions – though only slightly when one looks at the middle tertile. As expected, lower pension entitlements for those on lower incomes do not result in a significant decrease in the effectiveness of the pension system, as the reduction in the expected number of years in retirement reduces their 'pension requirements'. By contrast, in a price-uprated pension system

like the pre-reform UK system, the longer periods in retirement of those on high incomes do not translate in significant increases in pension entitlements as the relative value of benefits is reduced by the difference between price and wage inflation.

Table 9.34: Strength of the poverty alleviation & consumption smoothing functions in 2005 using different mortality and labour market participation assumptions

	Different mortality & labour market participation	**Same mortality & labour market participation**
Poverty threshold achievable (%)		
Bottom tertile	39%	41%
Middle tertile	47%	48%
Top tertile	54%	58%
Overall replacement rate achievable (%)		
Bottom tertile	56%	58%
Middle tertile	38%	39%
Top tertile	26%	30%

** This represents the poverty threshold (defined as a % of median disposable income) throughout retirement which net pension wealth at pension age could finance.*
^ This represents the replacement rate (defined in terms of pre-retirement income) throughout retirement which net pension wealth at pension age could finance.
Source: Own analysis using APEX.

While this analysis provides an interesting example of how having different assumptions on longevity and labour participation according to socio-economic class might affect the social sustainability indicators, it must be emphasised that the above conclusions relate specifically to the pension system modelled – i.e. the pre-reform UK system. This system was chosen as it was easier to find data which could be used to define assumptions. However, unfortunately this system is not representative of other European pension systems – which tend to be significantly more generous and much more earnings-related. In these systems – for example in NDC systems - having differential mortality and labour market participation might have much more serious implications. In the absence of adequately harmonised data on socio-economic current and future differences in mortality and labour participation, one cannot attempt a more in-depth quantitative analysis of this important matter. Thus this very important topic must be left as a topic for future research.

9.6 Conclusion

Chapter 8 sought to refine the estimates made in Chapters 6 and 7, by moving from a full-careers full-employment situation to something more approaching the real world, with partial

careers, part-timers and labour market non-participation. However given the assumptions taken in constructing this 'real world', it was crucial to study the sensitivity of results. Related to this, Chapter 8 had failed to study the impact of periods spent out of the labour market, due to unemployment or childcare provision, on pension entitlements. Similarly in order to move towards this 'real world' one would need to take into account socioeconomic differences in labour participation and longevity. In the same vein, it is important to test the sensitivity of pension systems to a number of broader assumptions underpinning the estimates, such as those on longevity and wage growth, which are particularly difficult to divine with any degree of certainty so far ahead in the future. This sheds light on the resilience of pension systems to shocks in demography and the macroeconomic environment.

Chapter 9 attempted to do all this, and in the process generated some interesting (and in some cases counterintuitive) results. Thus, for instance, if working lives were to remain at their 2005 level, pension systems would be less expensive. This is mainly as the growth in female pension entitlement would halt. As a result, pension systems in 2050 would achieve much less in terms of poverty alleviation and consumption smoothing. The size of future pension transfers would decline significantly, particularly for women and those on low incomes, particularly in countries with a strong link between contributions (and/or earnings) and benefits. This suggests that policymakers framed reforms on the assumption that more women would be getting their own entitlement to pensions (thus making up for the decline in system generosity). Another interesting result is that if higher female participation is complemented by longer working lives, there would be a positive impact on both system aims and constraints, with generosity rising without requiring increases in contribution rates.

Table 9.35 gives an overview of how labour participation impacts on the social sustainability indicators. It shows only those countries where effects are the strongest. The two main insights it provides are that labour market participation impacts more strongly the poverty alleviation function than consumption smoothing and that losses are very high if individuals in 2050 do not have longer working lives. The reformed systems would fail to deliver unless individuals work longer. The other consideration to make is that policymakers have focused their pension systems more on poverty alleviation – as longer working lives make more of an impact on the poverty threshold achievable rather than on the replacement rate on pre-retirement income. The gender impacts also differ interestingly, suggesting policymakers may have structured pension incentives to specifically reward higher female labour participation.

*Table 9.35: Overview of labour market impacts on system sustainability**

Poverty alleviation	*Consumption smoothing*	*Intergenerational balance*	*Financial sustainability*
If individuals in 2050 work an additional 3 years over anticipated increase			
Slovakia (+20%) Hungary (+9%) France (+8%) Finland(M) (+8%)	Sweden(W) (+13%) Hungary (+9%)	Slovakia(W) (+19%) Hungary (+11%) Italy (+10%)	Poland (-6%) Germany (-6%) France (-5%) Sweden (-5%)
If individuals in 2050 work the same number of years as now			
Slovakia(W)(-15%) Italy(W) (-12%) Poland(W) (-11%) Germany(W)(-11%) Hungary(W)(-11%) Austria(W) (-10%)	Hungary(W) (-10%) Finland(W) (-10%) Sweden(W) (-9%) Austria(W) (-8%) Hungary(W) (-8%) Poland (-8%)	Poland (-8%) Germany(W) (-8%)	Hungary (-12%) Germany (-10%) Poland (-9%) Slovakia (-9%)

** This table shows the countries where the social sustainability indicators are most susceptible to changes in the length of the contributory period (i.e. those with a change of close to or over 10%). It looks at the situation if working lives are 3 years longer than modelled in Chapter 8 and that if they remain unchanged at 2005 levels. Where impacts are principally felt by one gender, this is pointed out. A positive change means that the achievement of an aim or pressure on a constraint increases by that percentage over the Chapter 8 result, and vice-versa for a negative change.*

Changing longevity assumptions has very significant impacts on the social sustainability indicators, particularly for those countries which have not adopted features in their pension systems which automatically take into account improvements in life expectancy. However as pointed out in OECD (2009), these features "although they protect the finances of the pension scheme, they do so at the cost of varying individual retirement incomes".[200] Table 9.36 shows that longevity mainly affects constraints – particularly intergenerational balance. The impact on financial sustainability is also notable; particularly as even after reforms the required increases in contribution rates are quite steep. One may note that Poland is the second most affected country. This may be counterintuitive as it is an NDC system which should take into account longevity improvements. However, one needs to keep in mind that NDC systems take time to adjust. An unanticipated increase in longevity still has a cost, as pension benefits are computed according to projected longevity at the time of retirement. Pension benefits are then adjusted downwards gradually through lower indexation, particularly in systems with automatic balance mechanisms. The latter were not, however, modelled in this study. Moreover in the case of Poland, our modelling assumes many women will be on the minimum pension, which we assume would not be revised downwards because of higher longevity.

[200] This earns them the name of "automatic destabilisers".

*Table 9.36: Overview of longevity impacts on system sustainability**

Poverty alleviation	*Consumption smoothing*	*Intergenerational balance*	*Financial sustainability*
If individuals in 2050 live for an additional 2 years over anticipated increase			
		Hungary(W) (+20%) Italy (+15%) Slovakia (+15%) Poland (+9%) Germany(M) (+8%) Austria(M) (+8%) Finland(M) (+7%)	Hungary (+15%) Poland (+10%) Finland (+7%) Slovakia (+7%) Germany (+7%)

** This table shows the countries where social sustainability indicators are most susceptible to changes in longevity (i.e. those with a change of close to or over 10%). It analyses the case of longevity being 2 years higher than in Chapter 8. Where impacts are mostly felt by one gender, this is pointed out. A positive change means that the achievement of an aim or pressure on a constraint increases by that percentage over the Chapter 8 result, and vice-versa for a negative change.*

Turning to the treatment of contribution credits, the main finding is that the degree of pension rights protection afforded to childcare provision differs greatly across countries, but is generally better than that for unemployment. Incorporating these two effects, the estimates in this Chapter suggest that the pension system gender gap is less pronounced in some countries than shown in previous Chapters, and that the poverty alleviation function is stronger. Contribution credits can provide strong underpins to retirement incomes, particularly for countries with strong contribution-benefit links, such as NDC systems.

The design of pension systems also affects the impact of macroeconomic developments. For instance in Sweden, changes in wage growth should not result in considerable changes in social sustainability. By contrast, in countries like France and Italy, lower wage growth would impact very negatively on system constraints. The Swedish system is also less exposed than the Polish one to the effects of changes in interest rates. The UK with its modest and increasingly flat pension system is also not that affected by shocks.

This Chapter has shown that while the estimates of the social sustainability indicators can be further refined as they are sensitive to the modelling assumptions taken, broadly speaking their general trend and level do not change significantly. In terms of resilience to shocks, the simulations in this Chapter revealed that countries differ markedly. For instance, while Hungary would need an additional 6 percentage point increase in the required contribution rate to finance pensions if longevity rises by 2 years, the effect in Sweden would be limited to one percentage point. Similarly the length of working careers exerts very different effects. Thus in Slovakia, if working lives among men lengthen by 5 years, the projected loss in the strength of the poverty alleviation function would be cut by nearly a third. The same development in Italy would cut the projected drop in generosity by only a one-fifth.

Table 9.37: Changes in contribution rates (% of wages)

	Increase per additional year of longevity	Reduction per additional working year contributed
Austria	0.6	0.4
Finland	0.7	0.2
France	0.8	0.8
Germany	0.8	0.4
Hungary	3.2	1.1
Italy	0.3	0.1
Poland	1.7	0.8
Slovakia	1.4	0.5
Sweden	0.7	0.4
UK	0.2	0.1

Source: Own analysis.

NDC systems appear to be resilient to 'negative' shocks (e.g. higher longevity) in terms of the effect on system constraints. In countries without automatic adjustments, shocks have stronger impacts. For instance, the Hungarian system is very exposed to longevity improvements, even if accompanied by higher labour participation.

Table 9.38: Change in working lives required to retain contribution rates unchanged if longevity increases by an additional 2 years

	Years
Austria	3
Finland	6
France	2
Germany	4
Hungary	6
Italy	6
Poland	4
Slovakia	6
Sweden	3
UK	4

Source: Own analysis.

To conclude, the resilience of the strength of poverty alleviation to shocks seems to be dependent on minimum pensions. The strength of the consumption smoothing function is closely linked to the length of working lives, particularly in NDC countries or systems which have linked closer contributions and benefits. The pressure on constraints depends crucially on the presence of automatic features, particularly in relation to the impact of longevity. In countries like Sweden, Austria and France the fiscal impact of a two-year increase in longevity can be offset by an increase by a three-year increase in working lives. In others, such as Hungary, Finland and Slovakia, the required increase would be twice as high.

Conclusion

Over the last two decades, the pension landscape in Europe has changed substantially. Policymakers across the continent devoted particular attention to reforming pension systems, with the express objective of achieving sustainability. While the pace of reform has varied across countries, and in some the effects are not yet apparent, the scope of the reforms and their potential impact is such as to merit an in-depth assessment. In this light, this dissertation has tried to understand the contribution reforms may have made to achieving sustainability.

To tackle this question adequately, two theoretical issues need to be addressed:

III) Can one develop a concept of sustainability encompassing pension system adequacy within a context of fiscal sustainability?

IV) Which are the best measures for judging pension system adequacy?

On an empirical level, the relevant research questions are:

III) What is the current importance of state pensions in supporting living standards? How do reforms impact on generosity and system design?

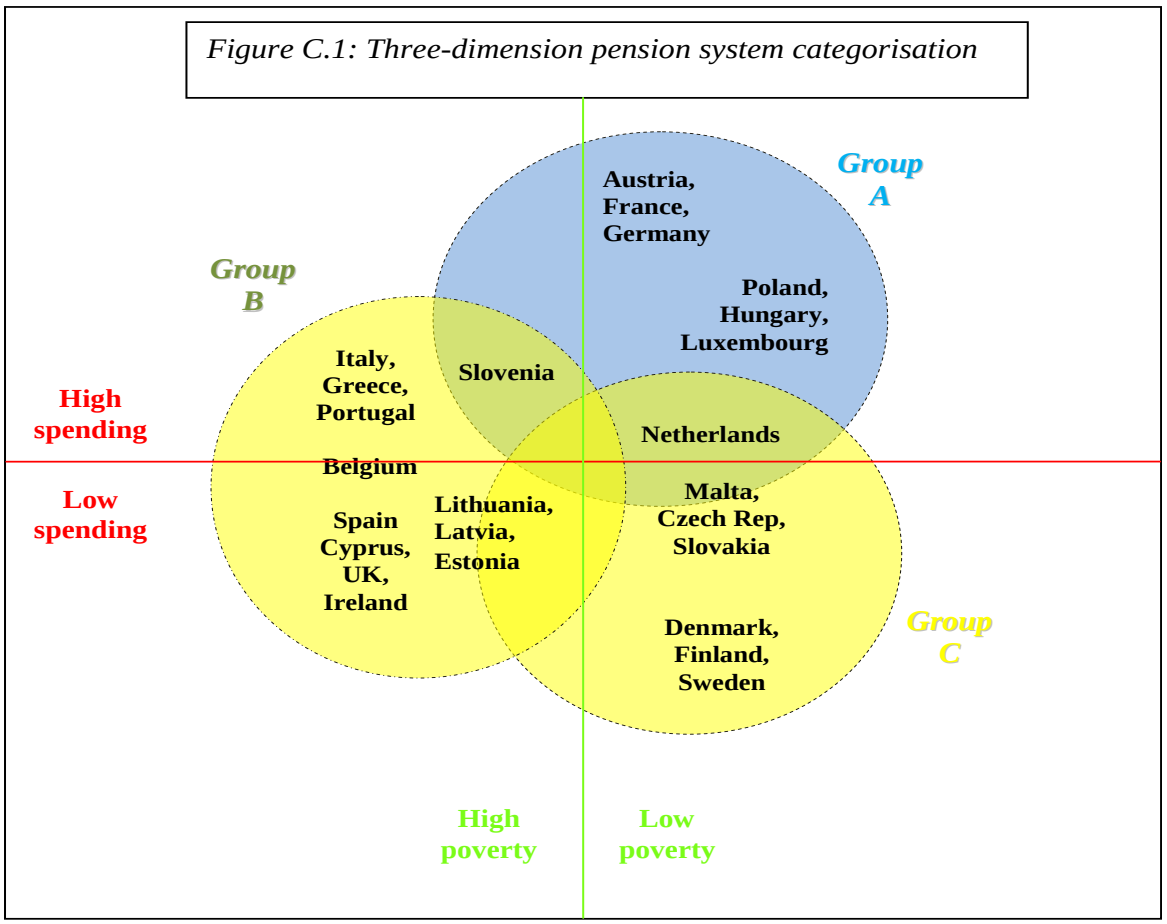
IV) Are the changes socially sustainable and what changes are required in saving and working longer for individuals to maintain living standards?

C.1 State pensions and their changing role

In our opening Chapter we tackled the first part of empirical question (I), by analysing the role of pensions in sustaining the income of elderly people. Our review showed that while there are significant differences in the size and design of systems, state pensions tend to be by far the main component of retirement income provision. This not only reflects market failures (such as adverse selection, moral hazard, myopia and imperfect capital markets) but also recognition of the economies of scale that come from collective state organisation of pension provision. Data on incomes show that while they fall with age, the drop following retirement is not dramatic in most European countries. State pensions appear to be especially important for those on lower incomes, women and the very old. The data, however, indicate that there are noticeable differences in the poverty alleviation and income replacement effects of different state pension schemes, and suggest that having similar institutional designs does not necessarily lead to similar income smoothing or poverty reduction.

Consequently, Chapter 2 sought to discover how the outcomes of pension systems are linked, so to understand better the real differences between countries' pension systems and help determine how reforms may change system performance. Given that the analysis made in

Chapter 1 indicated that pension spending is the largest item in government budgets and that its main goals are income replacement and poverty alleviation, we categorised pensions systems focusing on three dimensions - state spending, income replacement and the risk-of-poverty among the elderly population.



Note: Groups B and C are both coloured in yellow, as countries classified in these groups have low replacement rates; while those in Group A have high replacement rates. Countries placed above the horizontal line are high spenders on state pensions. Countries placed to the left of the vertical line have higher-than-average elderly poverty.

This process resulted in the identification of 4 relatively distinct groups of countries, depicted in Figure C.1. Group A (e.g. Germany, France, Austria, Poland, Hungary) are characterised by high levels of income replacement and low pensioner poverty, but high spending. At the other extreme, Group B countries have both low levels of income replacement and high rates of pensioner poverty. Countries in this group can be further divided into those with high (e.g. Italy) and low levels (e.g. UK) of state pension spending. Group C (e.g. Sweden, Finland, Slovakia) is at an intermediate position, with relatively low levels of spending and low rates of relative poverty among pensioners, but also low levels of income

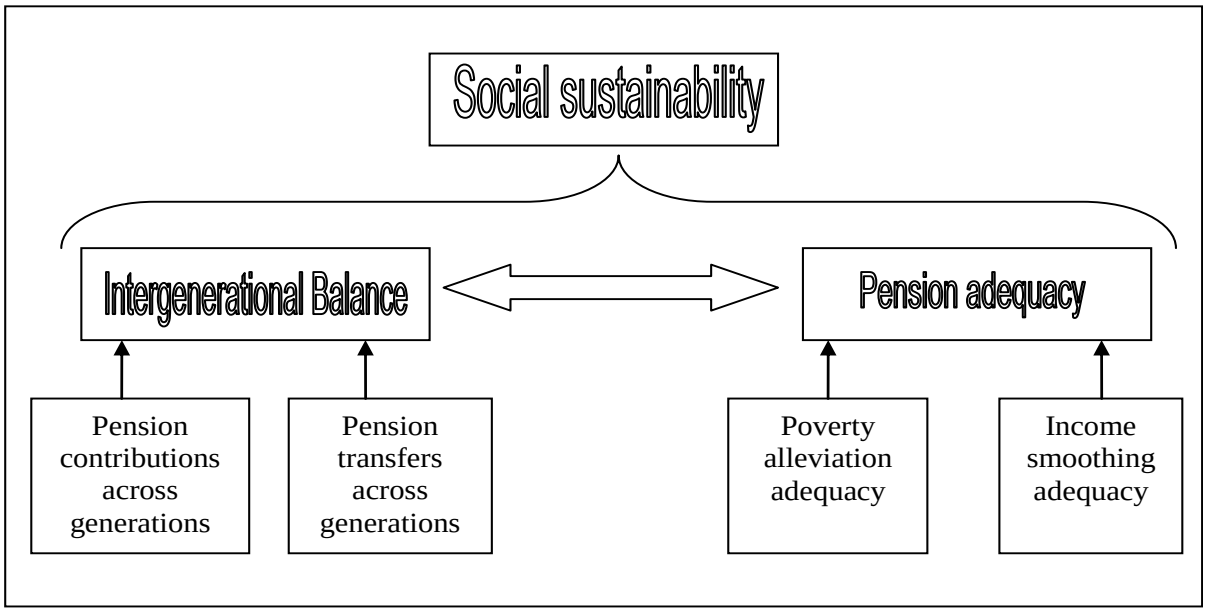
replacement in retirement. The importance of this new taxonomy is that it helps in understanding the possible sources of system stress – namely high spending in Group A, high poverty in Group B, and low replacement in Group C. Thus, a priori, one might expect that reforms in countries of Group A would have focused on curbing expenditure; reforms in countries of Group C to have concentrated on improving income replacement; and reforms in countries of Group B to have been focused on two aspects: in countries with high spending – the curbing of spending followed by measures to tackle poverty and income replacement, and in countries with low spending – the expansion of the pension system.

By contrast, the review of evidence on the pension reforms in Europe since the 1990s, presented in Chapter 3, shows that in most cases the main consideration was long-term financial cost (and in some cases, especially in Eastern Europe, short-term financial problems and a desire to reduce the state's role). The impact of reforms on the capability of pension systems to achieve their aims has tended to be ignored or not given primary importance. There have been some studies trying to assess the welfare implications of pension system reforms, but these have also adopted a very limited concept of system sustainability.

C.2 Defining and measuring pension system sustainability

In Chapter 4 we attempted to answer theoretical question (I) – how to develop a broader concept of sustainability encompassing pension system adequacy within a context of financial sustainability. We did not contest that financial sustainability is an important factor underlying the sustainability of a reform, but rather argued that simply focusing on it alone is seriously inadequate as by doing so, one fails to take into account what pension systems are expected to achieve. By adopting a narrow vision of spending on pensions, this approach fails to take into account potential feedback effects on fiscal spending from the impact of reforms on pension system adequacy. Fiscal sustainability and pension system adequacy are not conflicting aims, but rather two sides of the same coin. Real fiscal sustainability cannot be achieved without ensuring pension system adequacy. If pension systems fall short, there could be strong political pressure for higher government spending on other support.

Figure C.2: Fiscal sustainability and pension adequacy - Two sides of the same coin



Ageing will increase the required size of retirement provision, and simply placing such provision off the government budget is no guarantee that spending will not eventually increase. This is evidenced by the change in the World Bank's stance on pension reform, which now acknowledges that a reformed pension system needs to ensure poverty alleviation and income replacement for broad sections of society, while limiting fiscal pressures. Besides achieving these twin goals subject to the fiscal constraint, pension systems need to take into consideration the balance of transfers between different generations. Political pressures for reform can arise either because systems are not achieving the goals that individuals expect of them or because individuals are concerned about the deal they are getting compared to previous generations. Individuals can be concerned about the level of taxes they pay to finance the system but also by the level of their pension transfers compared to previous generations. Social sustainability can only be achieved if policymakers understand these tradeoffs and optimise pension systems in this light. Moreover policymakers must be able to do this in the presence of uncertainty, particularly as regards economic growth and longevity.

Chapter 5 set out the objectives policymakers should maximise to achieve social sustainability. A reformed pension system needs to be assessed jointly against four criteria – the achievement of the system goals of poverty alleviation and consumption smoothing across the whole population, and the pressure on the system constraints of intergenerational balance and financial sustainability. By contrast, up to now, evaluations of pension reform have either focused on spending or on the effect on theoretical replacement rates for full-career

individuals on average earnings. The latter have been widely used as measures of adequacy. However, they suffer from a number of important deficiencies, such as being limited to single point-in-time comparisons and failing to capture the impact of changes in longevity. This brings us to theoretical question (II) – how best to measure system adequacy.

Chapter 5 argued that this could be done by estimating pension wealth – i.e. the discounted stream of future pension payments during retirement, weighted by the probability that the individual will still be alive at that particular age. This measure captures the total pension transfer to an individual and is superior to replacement rates, as it captures the effects of benefit indexation post-retirement and of longevity. Pension wealth can be used to assess whether these transfers would result in individuals, on average, having an annual income that keeps them out of relative poverty during retirement,[201] and also to calculate more accurately the degree of consumption smoothing that pension systems allow.[202] Replacement rates at the point of retirement cannot do this as they fail to consider changes in the relative value of pensions over the retirement period. By comparing the pension wealth of two successive generations one can also arrive at an intuitive measure of intergenerational balance.[203] Moreover, in conjunction with demographic and labour market data, pension wealth can be used to assess the long-term contribution rate needed to keep the pension system in financial balance across generations.[204] This is a better measure of financial sustainability than focusing on projected spending on pensions (as a % of GDP) in one particular year as it takes into account the fact that longer-lived generations will require this spending for more years.

Having developed this framework to address the two theoretical questions set at the start of this research, we then proceeded in Chapter 6 to answer the second part of our empirical question (I) – namely assessing how reforms impact pension system generosity and design. This was done by estimating measures of pension wealth pre- and post-reform using the OECD's APEX pension entitlement model. These were then used to derive indicators of the four dimensions of social sustainability, described above, for ten countries. The latter,

[201] The relative poverty threshold was set at 35% of the average full-time wage in each country, which is broadly equivalent to the 60% of median equivalised disposable income threshold adopted by the EU. Note that in this case the pension wealth indicator, defined net of income taxes and social security contributions, was the average for the hypothetical individuals of each gender with below-median wages.

[202] We assessed how the annual average transfers implied by pension wealth at retirement would compare to pre-retirement income. Here the pension wealth indicator, defined net of income taxes and social security contributions, used was an average for all our employed hypothetical individuals.

[203] We compared the net pension wealth (average for all our employed hypothetical individuals) of the 2005 and 2050 pensioner generation defined in terms of the contemporary average wage in 2005 and 2050.

[204] To do this, one computes the average gross pension wealth (average for all our employed hypothetical individuals) of a generation and multiplies this by the system dependency ratio. This gives the percentage of the average wage which needs to be contributed by a generation of working age individuals to finance the pension transfers to a pensioner cohort.

namely Austria, Finland, France, Germany, Hungary, Italy, Poland, Slovakia, Sweden and the UK, not only cover 70% of the EU's population, but also span the four different pension typologies developed in Chapter 2, and include examples of various types of reforms.

At this intermediate stage, the analysis, like most other literature, assumed full careers in full-time employment. It also assumed that there is full take-up of minimum pensions and that no private retirement saving is taking place – strong assumptions for countries with means-testing and significant private pension saving as take-up of benefits and the level of savings clearly affect state entitlements. However, in contrast with many other studies which just look at average male earners, the four sustainability indicators were calculated looking at 9 hypothetical individuals for each gender at the different deciles of the full-time wage distribution in each country. Looking at different individuals is important as many pension systems are non-linear, and one cannot discern the poverty alleviation function of pensions by looking at average male earners. The benchmark for comparison was taken to be the situation in 2005 – when the pensioner generation was retiring under the pre-reform systems. By 2050, individuals were assumed to retire under the post-reform systems, while living longer lives.

The overall assessment, at this stage, showed that while reforms have reduced the poverty alleviation and consumption smoothing impacts in nearly all countries, generosity remains high in most of them. Reforms have mostly followed existing system goals, but with an eye to reduce future cost. However there have been some reforms, mostly in Eastern Europe, which may have raised issues about the future adequacy of pension systems for women and those on lower incomes as the degree of progressiveness has been reduced considerably. Moreover with only some exceptions, the reforms still appear to leave pension systems relatively unprepared for the financial impact of the ageing transition. This may potentially reflect the fact that reformers have not grasped the full implications of longevity increases, possibly as the sustainability indicators which they used do not capture this element.

The main contribution of this analysis lies in four methodological innovations. Firstly, it uses pension wealth – a measure of overall generosity of transfers throughout retirement - rather than measures of generosity at the point of retirement. This captures the impact of two elements, namely longevity and indexation rules, which tend to be ignored despite that they have important consequences for the achievement of system goals and pressures on system constraints. The second innovation is the explicit use of benchmarks against which to assess pension entitlements. Most frequently policy makers have not sought to look at benchmarks in this area, preferring to retain a good level of discretion on what constituted 'adequate' outcomes. While the benchmarks used here can be seen as arbitrary, the framework is flexible

enough to allow the testing of various outcomes. The third innovation is to attempt to measure all elements using the same indicators instead of using different models. This increases transparency and also clearly illustrates the trade-offs between system goals and constraints. Finally this framework is able to incorporate distributional and gender analysis – an element of pension reform assessment that has frequently not been given enough importance by policymakers.

This modelling framework allows the analysis of various sub-questions and can be used to generate a lot of in-depth analysis of the consequences of reforms. The framework lends itself to being used across different pension regimes and enables comparison of reforms which are very different in nature. It can also be used to see how systems are changing and the extent of convergence in system goals and pressure on constraints. This multi-faceted framework is not however to be conceived as some form of benchmarking exercise. Rather its main aim is to capture as much as possible the full implications of reforms in order to arrive at some understanding of the potential pressures policymakers could face in the future. This aim is justified in view of the broader concept of sustainability, developed in Chapter 4, and implies that the framework could be used to map the tactical and strategic decisions which policymakers have taken or need to take to achieve long-term stability in this field.

The conclusions in Chapter 6 were based on a comparison of the sustainability indicators for the current situation and the future post-reform situation. This benchmark, while capturing how the effectiveness of pension systems will change over the future, may, however, belittle the achievements of the reforms. The pre-reform and post-reform scenarios, in fact, differ in one important dimension – time – which is expected to bring about considerable stresses on the effectiveness of pension systems. Between 2005 and 2050, not only is longevity expected to improve significantly, but also systems will have to face the retirement of the Baby Boom generation – which will bring about an abrupt change in the size of the pensioner population across Europe.

Chapter 7 looked at how these two effects would have affected the cost of financing the current systems as against the reformed systems. It then assumed that this increased cost would have decreased the relative disposable income of the working age generation of 2050. The other social sustainability indicators for the pre-reform systems in 2050 were then estimated in this light. In contrast to what Chapter 6 had suggested, Chapter 7 revealed that the reforms have cut substantially the implied increase in long-term contribution rates. It confirmed that in most countries, this was achieved without endangering significantly the overall adequacy of pension systems. In fact, the UK managed to increase generosity, while

not overburdening future finances by legislating significant increases in the state pension age. However the Chapter further corroborated the finding that the risk-of-poverty under the reformed systems has significantly heightened in some countries – mainly those East European countries which have reduced substantially the progressivity of their pension systems. It also appears that in many European countries, the consumption smoothing function of the state pension system for middle-to-high earners has diminished in strength and may need to be supplemented by other means. The increased financial sustainability of the reformed pension systems, moreover, has resulted in considerable cuts in pension wealth in some countries, which may create future political pressures.

C.3 More realistic modelling of pension system sustainability

Up to this stage, analysis focused solely on the hypothetical full-career cases in full time employment for both genders. This assumption, though analytically convenient, is unrealistic and poses problems for our proposed sustainability framework. The assumption of complete full-time employment over-represents the real efficacy of existing pension systems, by over-estimating the achievement of goals, since it implies that individuals benefit from the maximum generosity of the system, while diminishing the constraints faced, as it boosts the support ratio. Moreover, reformers may have based their policy choices on the understanding that there would be developments in the labour market which would offset part of the effects of their reforms. Thus while the results of Chapter 6 and 7 provided answers to empirical question (I) – how reforms impact on pension system generosity and design, they fail to provide an adequately effective answer to empirical question (II) – namely whether changes are socially sustainable and the required changes for individuals to maintain living standards. To answer these questions, one needs to move away from the full-career assumption and adopt more representative labour market assumptions. This was done in Chapter 8.

Lack of comparable data on contribution records raises significant issues when moving away from the assumptions of Chapters 6 and 7. Nevertheless, Chapter 8 sought to present a more realistic estimate of the social sustainability indicators, by adding two hypothetical individuals for both genders – one engaged in part-time employment and another who has never engaged in any formal employment and thus is dependent on the minimum pension. Moreover instead of assuming full-careers for those in employment, estimates of the number of years spent in the labour market were constructed using EU LFS data on employment rates by age. Finally to construct aggregate indicators, results for the full-time and part-time

employed individuals were weighted in accordance with their relative importance in LFS data. While still subject to significant caveats, these estimates should present a more realistic view of the present and future efficacy of pension systems being studied.

In fact, current and projected labour participation rates, particularly among women, differ greatly among the ten countries. There are also interesting cross-country differences in part-time employment. The new estimates confirmed that the interaction between the labour market and the social protection system needs to be considered by researchers and policymakers alike. A system may look very generous on paper, but not be so in reality if only few individuals qualify for full benefits. This tends to be particularly pertinent for women. The estimates in Chapter 8 of the strength of the poverty alleviation function are far lower than in Chapters 6 and 7 (see Table C.1). For instance, the poverty threshold currently provided, on average, by the French pension system[205] drops to 63% from 73% among men and from 67% to 44% among women. Overall, the results in this Chapter are more in line with current data on the actual risk-of-poverty and gender gaps in poverty risks. For example, under the full-career assumption, Italian women were among the best provided for across Europe. The estimates in this Chapter show that this is not the case.

While these are important contributions, potentially the most interesting finding is that labour market trends can act as a countervailing force that offsets part of the effect of the pension reforms. This is particularly true in those countries where the reforms created closer links between contributions and benefits. Chapters 6 and 7 had shown women as being the main losers of the reforms, with very substantial losses anticipated, for instance, among women in Poland and Slovakia. The more realistic assumptions in this Chapter reverse this finding for some countries, as can be seen from Table C.1, though it should be noted not for those countries with the strongest losses. Growing labour participation might actually result in improvements over time in pension entitlements for women despite the reforms, cases in point being France and Germany. Moreover in many countries, cuts in the general pension system's generosity have been complemented by a strengthening of minimum pensions. This has the potential to reduce the impact of the reforms on pensioner poverty. Gender gaps in replacement rates should also decline, as men (with their fuller contributory records) will lose more in actual entitlement than women.

[205] This is estimated by comparing the average pension wealth for the hypothetical individuals with below-median wages with the median equivalised disposable income in that country.

Table C.1: The poverty thresholds (% of median disposable income) achievable in 2005 and 2050 under different labour market assumptions

a) Men

	Full-careers assumption^			Actual-careers assumption*		
	2005	2050	Change in p.p.	2005	2050	Change in p.p.
Austria	96	85	-11	95	74	-21
Finland	79	72	-7	64	66	+2
France	73	62	-11	63	59	-4
Germany	69	58	-11	61	59	-2
Hungary	79	82	+3	70	65	-5
Italy	99	78	-21	95	68	-27
Poland	77	54	-23	66	50	-16
Slovakia	102	77	-25	93	51	-42
Sweden	72	64	-8	70	65	-5
UK	48	61	+13	46	59	+13

b) Women

	Full-careers assumption^			Actual-careers assumption*		
	2005	2050	Change in p.p.	2005	2050	Change in p.p.
Austria	69	70	+1	68	61	-7
Finland	70	64	-6	57	58	+1
France	67	59	-8	44	59	+15
Germany	55	52	-3	48	56	+8
Hungary	73	79	+6	68	59	-9
Italy	79	71	-8	68	50	-18
Poland	68	39	-29	55	35	-20
Slovakia	82	62	-20	74	41	-33
Sweden	60	54	-6	59	56	-3
UK	41	60	+19	39	56	+17

^ *These indicators are the average for the 4 hypothetical full-timer full-career workers with below-median wages.*

** These indicators are the weighted averages for 4 hypothetical actual-careers full-timers with below-median wages and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.*

Source: Own analysis using APEX.

Table C.2: The average replacement ratios (% of pre-retirement wages) achievable in 2005 and 2050 under different labour market assumptions

a) Men

	Full-careers assumption^			Actual-careers assumption*		
	2005	2050	Change in p.p.	2005	2050	Change in p.p.
Austria	91	78	-13	89	66	-23
Finland	75	69	-6	59	59	0
France	68	57	-11	56	58	+2
Germany	85	68	-17	71	69	-2
Hungary	85	90	+5	74	62	-12
Italy	92	72	-20	92	67	-33
Poland	87	63	-24	67	56	-11
Slovakia	72	67	-5	62	56	-6
Sweden	66	62	-4	66	59	-7
UK	40	48	+8	37	53	+16

b) Women

	Full-careers assumption^			Actual-careers assumption*		
	2005	2050	Change in p.p.	2005	2050	Change in p.p.
Austria	83	82	-1	75	66	-9
Finland	75	70	-5	58	60	+2
France	71	61	-10	41	51	+10
Germany	82	71	-11	59	67	+8
Hungary	83	90	+7	74	64	-10
Italy	82	73	-9	65	50	-15
Poland	86	50	-36	65	43	-22
Slovakia	83	67	-16	75	56	-19
Sweden	71	64	-7	66	57	-9
UK	44	60	+16	40	57	+17

^ *These indicators are the averages for the 9 hypothetical full-timer full-career workers.*
** These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the respective share of full-time and part-time workforce in each country.*
Source: Own analysis using APEX.

By contrast, the consideration of labour market participation did not result in any significant reinterpretation of the development of intergenerational transfers. Rising labour participation and increasing longevity should result in net pension wealth expanding slightly. While in Chapters 6 and 7, women were seen to lose out compared to men, on account of the equalisation of pension ages, the analysis in Chapter 8 shows them (in some countries) as losing less as their entitlements are buoyed by their rising labour participation (see Table C.3).

Table C.3: The net pension wealth of the 2050 generation compared to that of the 2005 generation under different labour market assumptions (%)

	Male		Female	
	Full-careers assumption^	Actual-careers assumption*	Full-careers assumption^	Actual-careers assumption*
Austria	109	94	98	87
Finland	114	125	106	119
France	98	101	96	141
Germany	92	104	95	124
Hungary	131	116	112	82
Italy	95	77	87	76
Poland	106	83	69	73
Slovakia	109	80	79	58
Sweden	107	112	100	96
UK	127	127	112	117

^ These indicators are the averages for the 9 hypothetical full-timer full-career workers.
** These indicators are the weighted averages for the 9 hypothetical actual-careers full-timers and the hypothetical part-timer. The weights reflect the share of full- and part-time workforce in each country.*
Source: Own analysis using APEX.

Turning to fiscal sustainability, the estimates of the financing requirements of pension systems are significantly higher, on average, a contribution rate of 17% is required as against the 11%, as can be seen from Table C.4. Moreover in the absence of reforms, fiscal pressures would have increased substantially more than hypothesised in previous Chapters. The impact of the ageing transition, in fact, would be compounded by the impact of increasing women's entitlement to pensions. The reforms, however, partially address this factor so that the increase in fiscal pressures by 2050 is not as high as one could expect.

*Table C.4: Comparing financial sustainability under the different careers assumptions**

	Full-careers assumption			Actual-careers assumption		
	2005	Pre-reform 2050	Post-reform 2050	2005	Pre-reform 2050	Post-reform 2050
Austria	13.8	27.3	22.7	19.3	47.7	26.8
Finland	8.5	20.4	18.3	8.7	23.7	20.9
France	14.6	29.6	24.3	21.0	50.3	41.4
Germany	8.0	17.9	14.4	11.8	39.6	20.9
Hungary	22.0	43.0	30.8	37.7	80.9	44.5
Italy	17.3	34.1	24.7	29.7	67.1	31.6
Poland	8.4	30.4	20.7	14.4	67.7	34.7
Slovakia	11.1	35.9	24.6	20.6	85.4	38.7
Sweden	10.1	18.3	16.7	11.5	30.4	21.5
UK	5.8	7.1	6.7	9.1	17.6	10.3
Average^	11.1	23.6	18.3	17.5	47.2	27.2

** The proportion of total lifetime wages needed to finance the pension wealth of different generations.*
^ The contribution rate of a country is weighted in line with relative population size.
Source: Own estimates using APEX, EU labour market and population projections.

While Chapter 8 refined the estimates made in Chapters 6 and 7, by moving from a full-careers full-employment situation to something more approaching the real world, with partial careers, part-timers and labour market non-participation, it did not consider the impact of unemployment and periods spent providing childcare on pension entitlements. Similarly it did not take into account socioeconomic differences in labour participation and longevity. This was done in Chapter 9, where the social sustainability indicators were modified to reflect contribution credits for unemployment and childcare provision. Incorporating these two effects, the estimates in Chapter 9 suggest that the pension system gender gap is less pronounced in some countries than shown in previous Chapters, and that the strength of the poverty alleviation is stronger. Contribution credits can provide strong underpins to retirement incomes, particularly for countries with strong contribution-benefit links.

Modifying the social sustainability indicators to reflect socio-economic differentials in labour participation and mortality was only possible for the UK, due to data limitations. This indicated that while the pension entitlements of those on low incomes may be lower than previously estimated, and vice versa for those on higher incomes, this does not affect the social sustainability indicators that much. Thus while the estimates of the social sustainability indicators can be further refined as they are sensitive to the modelling assumptions taken, broadly speaking their general trend and level do not change significantly.

That said, it should be emphasised that while the evidence presented in this research provides clearer insights on pension system sustainability than that found in most existing literature, it still does not provide precise and definitive answers. In particular, the absence of any modelling of the impact of household formation raises a number of concerns in some countries (particularly those which rely more on means-tested benefits). While other approaches, such as dynamic microsimulation, could address these issues, they would themselves face other difficulties (notably it would be very difficult to achieve the same degree of understanding of the direct effects of reforms). Besides the construction of a dynamic microsimulation model for ten countries would be a very daunting task, and results would still be subject to considerable uncertainty.

C.4 Pension system resilience to shocks and impact of changes in economic behaviour

To complete the system sustainability analysis, one final element remained to be studied - the resilience of pension systems to different types of shocks. Moreover changes in individual economic behavior could also help ensure pension system sustainability – as implied in the

second theoretical question posed at the start of this research. Estimates presented in Chapter 8 suggest that in most countries individuals would need to save relatively high amounts in order to get the same net pension wealth as from the pension systems of the 2005 pensioner generation. A more likely objective is to generate the same replacement rates but accepting the adjustment of state pension ages (see Table C.5). In most countries, notably Poland and Slovakia, this task is, however, quite difficult as individuals will also be called upon to pay higher contribution rates to pay for contemporary pension transfers. Longer working lives may present a more likely way of maintaining consumption smoothing possibilities.

Table C.5: Required additional saving (% of wages) to maintain same level of consumption smoothing in 2050 as under pre-reform system – assumed net rate of return of 5.5%

a) Men

	10th Decile	20th Decile	30th Decile	40th Decile	50th Decile	60th Decile	70th Decile	80th Decile	90th Decile	Part-time
Austria	7.6	7.6	7.6	7.5	7.7	8.0	8.5	9.2	8.0	8.7
Finland										
France			2.6	4.8	4.8	4.6	5.1	4.7	4.0	5.1
Germany		0.6	0.8	1.1	1.4	1.8	2.3	3.0	4.0	1.4
Hungary	0.4	0.4	0.4	0.4	0.4	0.3				
Italy	13.3	13.4	13.5	13.5	13.7	13.9	13.9	13.6	13.2	13.6
Poland	8.9	7.2	6.3	4.7	4.3	3.7	2.8	1.8	0.6	6.4
Slovakia	12.6	12.9	13.1	13	11.5	7.5	3.6			12.9
Sweden	3.4	2.1	2.2	2.4	2.5	2.6	2.7			
UK										

b) Women

	10th Decile	20th Decile	30th Decile	40th Decile	50th Decile	60th Decile	70th Decile	80th Decile	90th Decile	Part-time
Austria	2.2	3.8	4.0	3.2	3.0	3.0	3.0	3.1	3.8	3.3
Finland										
France										
Germany								0.2	1.0	
Hungary	7.8	5.3	6.8	5.6	5.8	6.0	6.3	5.9	5.6	6.0
Italy	6.3	5.2	6.2	5.8	5.8	5.8	5.8	6.3	6.4	5.8
Poland	15.4	14.6	13	12.5	11.9	11	9.7	8.3	6.7	12.6
Slovakia	17.7	18.2	18.5	18.7	18.9	18.9	19.0	16.3	6.6	18.7
Sweden	5.0	5.1	4.4	3.1	3.3	3.5	3.7	4.0	0.7	3.9
UK										

Source: Own workings using APEX.

Chapter 9 looked in more detail at the impact of different contribution periods on pension system sustainability, with a number of interesting, and in some cases counterintuitive, results (see Table C.6). Thus, for instance, if working lives were to remain at

their 2005 level, pension systems would be less expensive. This is mainly because the growth in female pension entitlement would halt. As a result, pension systems in 2050 would achieve much less in terms of poverty alleviation and consumption smoothing. The size of future pension transfers would also decline significantly, particularly for women and those on low incomes, particularly in those countries with a strong link between contributions (and/or earnings) and benefits. This suggests that policymakers framed pension reforms on the assumption that more women would be getting their own entitlement to pensions (thus making up for the decline in pension system generosity). Another interesting result is that if higher female participation is complemented by longer working lives, there would be a positive impact on both pension system aims and constraints, with replacement rates rising without requiring increases in contribution rates. This provides potential answers to the second part of our empirical question (II) – namely what are the required behavioural changes for individuals to maintain pre-reform levels of living standards during retirement.

*Table C.6: Overview of labour market impacts on system sustainability**

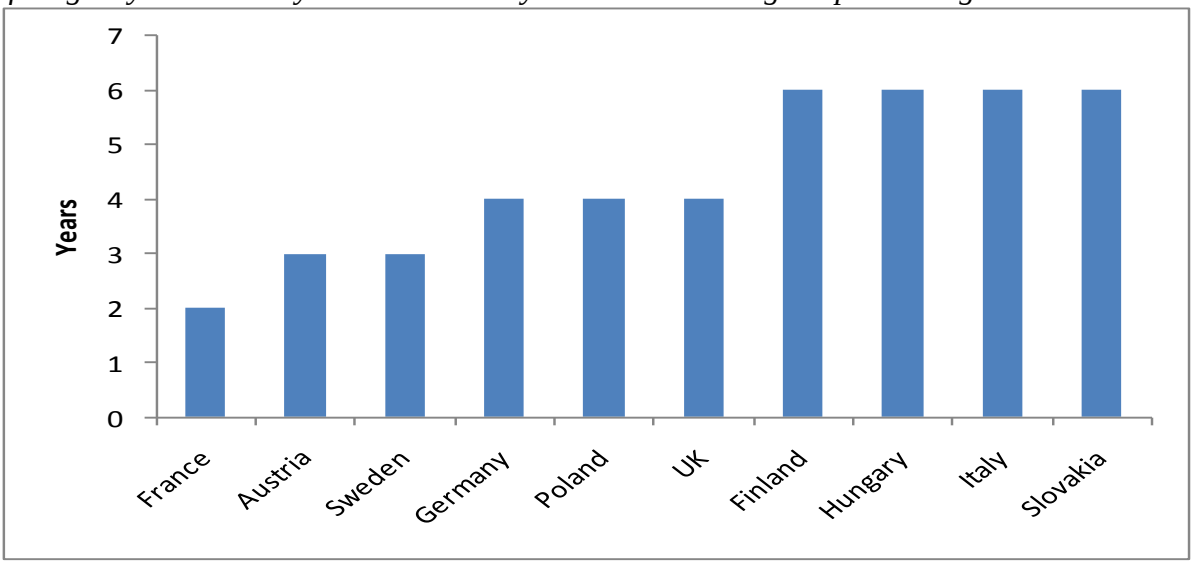
Poverty alleviation	*Consumption smoothing*	*Intergenerational balance*	*Financial sustainability*
Austria (+5%)	Austria (+5%)	Austria (+7%)	Austria (-3%)
Finland (+8%)	Finland (+1%)	Finland (+7%)	Finland (0%)
France (+8%)	France (+6%)	France (+4%)	France (-5%)
Germany (+1%)	Germany (+4%)	Germany (+1%)	Germany (-6%)
Hungary (+9%)	Hungary (+9%)	Hungary (+11%)	Hungary (-5%)
Italy (+6%)	Italy (+6%)	Italy (+10%)	Italy (-1%)
Poland (+6%)	Poland (+4%)	Poland (+4%)	Poland (-6%)
Slovakia (+20%)	Slovakia (+6%)	Slovakia (+19%)	Slovakia (0%)
Sweden (+6%)	Sweden (+13%)	Sweden (+4%)	Sweden (-5%)
UK (+3%)	UK (+3%)	UK (+2%)	UK (-3%)

** This table shows the impact on the social sustainability indicators of working lives in 2050 being 3 years higher than modelled in Chapter 8. A positive sign means a higher achievement of system objectives and more pressure on constraints, and vice versa for negative signs.*
Source: Own analysis using APEX.

Returning to the issue of resilience to shocks, Chapter 9 showed that different longevity assumptions have significant impacts on the sustainability indicators, particularly for those countries which have not adopted features in their pension systems which automatically take into account improvements in life expectancy. The resilience of poverty alleviation to shocks seems to be very dependent on the generosity of minimum pensions, while that of consumption smoothing is linked to the length of working lives, particularly in systems which have linked closer contributions and benefits. As for the pressure on constraints, this depends on the presence of automatic features. In countries like Sweden, Germany, and France the

fiscal impact of a two-year rise in longevity can be offset by a three-year increase in working lives, while in others, such as Hungary, Italy, and Slovakia a six-year increase would suffice.

Figure C.3: Change in working lives (years) required to retain contribution rates unchanged if longevity increases by an additional 2 years with no change in pension age



Source: Own analysis using APEX.

C.5 Policy considerations and further research

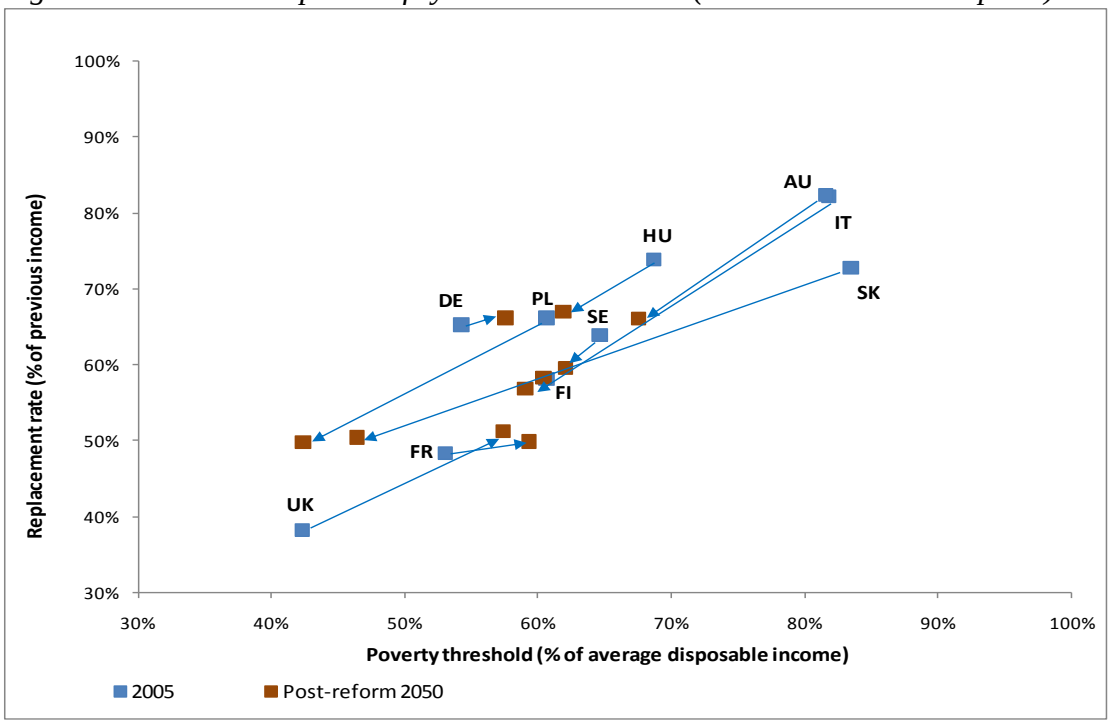
The achievement of sustainability has been the main objective that policymakers have set themselves when reforming pension systems. While this research acknowledges, and its findings confirm, the importance of achieving long-term sustainability of pension systems given the significant challenges they face, it has argued that policymakers need to adopt a more comprehensive definition of sustainability. When looking into the future, policymakers need to reassure themselves not only that pressure on constraints is being managed properly, but also that the pension system remains effective and is in a position to achieve the goals it is expected to. To do this, policymakers need to be able to map out the impact of reforms on the strength of the poverty alleviation and consumption smoothing functions, particularly for groups with low incomes and/or partial careers, together with the influence reforms have on relative size of transfers between generations, both in terms of the net pension wealth accruing to future generations and the contribution rates required to finance these transfers.

Figures C.4 and C.5, taken from Chapter 8, present an example of how this mapping out can be made. They compare how the achievement of the twin goals of pension systems and the pressure on system constraints should change by 2050 when looking across the aggregate pensioner population. This approach allows one to understand whether one aim is being sacrificed for better results on the other, and provides an indication of how the role and scope

of state pension systems will evolve. The fact that this comparison is done on a cross-country basis also allows one to understand how different policymakers reacted to similar challenges. There are some quite striking similarities. For instance, only countries which faced a very substantial fiscal challenge due to ageing put in place reforms that cut the relative size of total pension transfers to future generations. In most countries, the reforms offset only part of the effect on pension wealth of the projected rise in longevity, and accommodate the projected change in the relative size in the pensioner population by a rising (implied) contribution rate.

Figure C.4 points out how most countries will converge towards providing pension wealth which keeps individuals above the 60% poverty threshold throughout retirement. The only exceptions appear to be Poland and Slovakia. Despite these radical cuts, these countries will still experience large increases in their financing costs (see Figure C.5), on account of steeply declining support ratios. Improving employment rates could help stem these developments. In a similar vein, in France the system seems to face significant fiscal challenges, which could be partially addressed by increasing employment at older ages.[206]

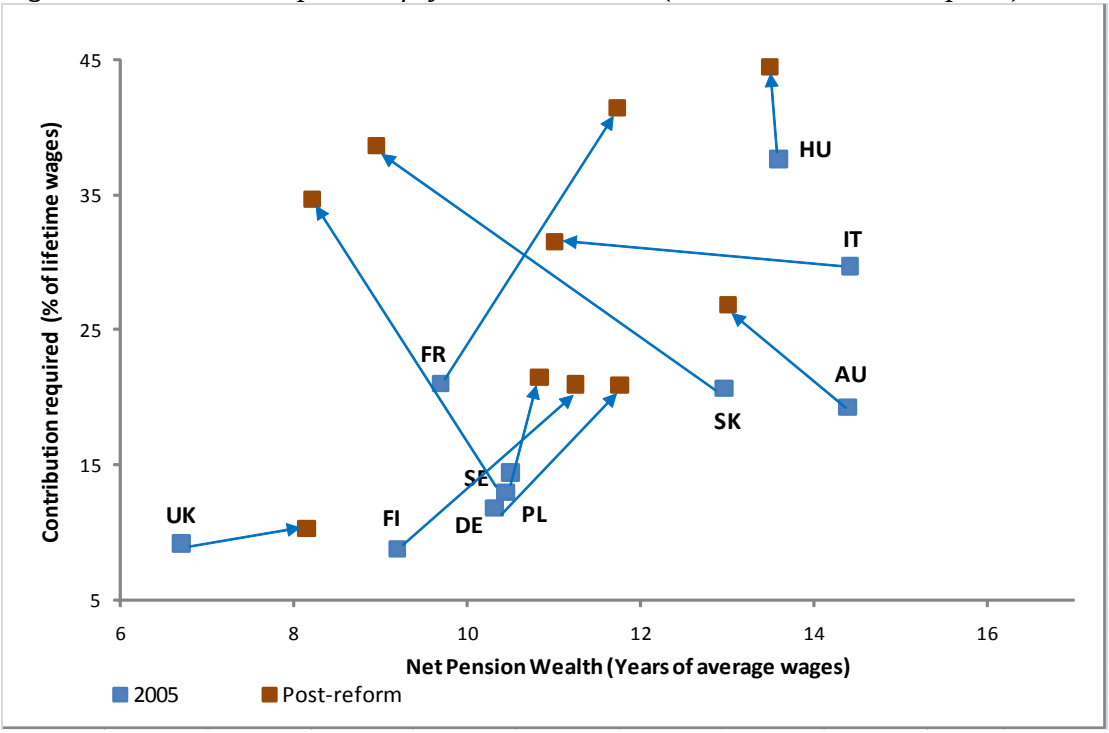
Figure C.4: The development of system achievements (actual-careers assumption)



Note: The indicators presented show the poverty threshold (as a % of the national median disposable wage) that could be achieved, on average, throughout retirement by our estimates of the average net pension wealth of our 4 hypothetical individuals of each gender with below-median wages in each country. They also show the replacement rate (% of the individuals' pre-retirement wage) that could be achieved, on average, throughout retirement by our estimates of the average net pension wealth of our 9 hypothetical full-time workers and our part-time worker of each gender (weighted in line with the share of full-time and part-time employment in that country).

[206] Hungary also faces pressures, but these may have been addressed by recent reforms not modelled here.

Figure C.5: The development of system constraints (actual-careers assumption)



Note: The indicators presented show the average net pension wealth (in terms of the contemporary average wage) of our 9 hypothetical full-time workers and our part-time worker of each gender (weighted in line with the share of full-time and part-time employment in that country).They also show the contribution rate (% of lifetime wages) required to finance this average net pension wealth given the ratio of pension beneficiaries to contributors.

The above analysis can be deepened by looking more closely at the social sustainability indicators, and zooming to particular sections of the population. For instance, the poverty alleviation function mainly targets those on lower incomes, whereas the income smoothing function is particularly relevant for those on middle-to-high incomes. In Table C.7, we show how the relative poverty risk and income smoothing adequacy could change by 2050, together with the associated change in the relative size of pension wealth and in the contribution rate required to finance these transfers. These show that in some countries, like Poland and Slovakia, pensioner poverty could become an issue, while in others future pensioner generations may be seen to be favoured at the expense of current pensioner generations (e.g. Finland, UK) and/or future generations of workers (e.g. France). At the same time, it is important to stress that these considerations are valid only if the assumptions on future employment growth and longevity prove correct. In some countries, the assessment would be very different if working careers remained unchanged (particularly among women) – e.g. poverty risks in Germany and Italy would be higher – or if longevity were to improve at a

faster pace – e.g. the contribution rate in France and Hungary would need to rise by substantially more.

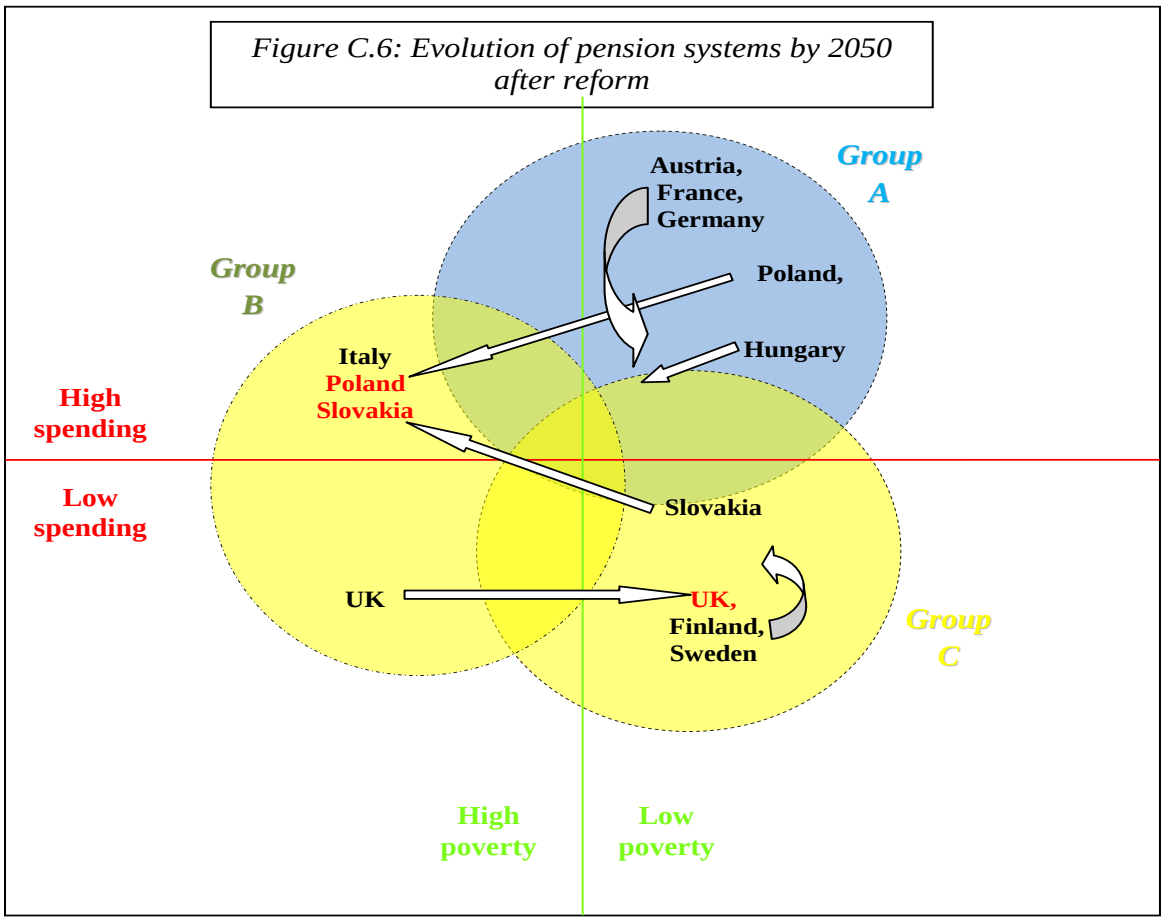
*Table C.7: The social sustainability of pension systems in 2050**

	Change in poverty alleviation(1)	*Change in income smoothing (2)*	*Change in net pension wealth (3)*	*Change in contribution rate (4)*	*Sensitivity to shocks*
Austria	+0.2	0.0	-10%	+7.8	Employment – 1
Finland	-2.9	-4.5	+22%	+11.0	Employment – 4
France	-8.3	-2.4	+21%	+18.8	Longevity – 4
Germany	-5.9	-0.1	+14%	+8.6	Employment – 1
Hungary	+0.1	+0.9	-1%	+8.0	Longevity – 4
Italy	+2.8	+5.6	-24%	+1.5	Employment – 1
Poland	+18.2	+20.7	-22%	+17.7	Employment – 1
Slovakia	+14.4	+24.9	-31%	+17.4	Employment – 1
Sweden	+5.4	+6.4	+4%	+8.2	Employment – 2
UK	-24.8	-18.9	+22%	+1.3	Longevity – 3

(1) The change in relative poverty captures the change by 2050 in the proportion of the individuals at the 10th to 50th wage deciles, in part-time work and those on minimum incomes who would be at risk of relative poverty and the depth of this risk. An index value of 0 implies that no one of those concerned ever spends a year in retirement with an income below the poverty threshold. Negative values mean that the risk will be lower in 2050.
(2) The change in income smoothing captures the change by 2050 in the proportion of the individuals at the 30th to 70th wage deciles who would have a replacement rate less than 60% and the size of the gap from this threshold. An index value of 0 implies that no one of those concerned ever spends a year in retirement with a replacement rate of less than 60%. Negative values mean that the risk will be lower in 2050.
(3) The change in net pension wealth captures the % change in the relative size of net pension wealth (defined in terms of the contemporary average wage) by 2050. Negative values mean that future generations will be entitled to a lower net pension wealth in relative terms.
(4) The change in contribution rate captures the change in percentage points of the average wage in the contribution rate required to finance the pension transfers to the 2050 generation.
(5) Sensitivity to shocks captures the external factor that would most put at risk the social sustainability indicators for the pension system in question. In brackets, the most affected social sustainability indicator is noted. E.g. Employment – 1 means that the primary risk to the system is for poverty alleviation to be low because employment does not grow.

Figure C.6 attempts to show how the composition of the different pension system categories might change by 2050 as a result of reforms. The first thing to keep in mind is that the world in 2050 will be very different than in 2005, as can be inferred from the averages for the four indicators shown in Figures C.6 and C.7. In particular, the horizontal line (spending) will be higher up, the degree of replacement rate will diminish (so intersections between Groups may grow) and the vertical line (poverty) will possibly be slightly more to the right.

Figure C.6: Evolution of pension systems by 2050 after reform



Note: Groups B and C are both coloured in yellow, as countries classified in these groups have low replacement rates; while those in Group A have high replacement rates. Countries placed above the horizontal line are high spenders on state pensions. Countries placed to the left of the vertical line have higher-than-average elderly poverty.

The estimated changes in the social sustainability indicators suggest that while there will be three general groups of countries; the composition of the groups could change significantly. For instance, Poland and Slovakia could go to join Italy in Group B, as their level of pensioner poverty could be negatively affected by the pension reforms they have put in place, while at the same time the lack of labour participation combined with ageing will result in a substantial increase in their pension financing cost. Group B will, however, probably lose one member, the UK. By focusing resources even more on those on low incomes and women, the UK pension system should make inroads on pensioner poverty while maintaining spending low on account of the planned increase in pension ages. The UK could join the Scandinavian duo, Finland and Sweden, but these might be moving closer to the red line to somewhere close to the position held at present by Slovakia, as their financing cost will increase. In Group A, besides the movement of Poland, we have Hungary moving slightly downwards, and getting closer to the green line, as the reforms leave some groups at-risk-of-

poverty. The position of Austria, Germany and France will also change, as they move closer to Group C in terms of the replacement rates they provide. One could argue that France will separate from the other two, as it faces much higher projected increases in spending, and join Hungary, but at the same time the French system appears to have a much more effective poverty alleviation function than the Hungarian one. The only country that might still be in the same place it occupies today is Italy. While the reforms mean that it will be less of an outlier in spending terms, low labour participation among older workers and women, together with lack of pension protection for the unemployed could keep pensioner poverty levels high while the reforms have cut the replacement rates individuals can look forward to in 2050.

Systems with automatic adjustments appear to be resilient to 'negative' shocks (e.g. higher longevity and unchanged working careers) in terms of the effect on system constraints. The impact on achievement of system objectives – particularly the strength of the poverty alleviation function, by contrast, varies in line with the generosity of the minimum pension schemes. Thus the losses in the Italian and Swedish systems are less pronounced than in Poland. In countries without automatic adjustments, shocks inevitably result in stronger impacts, though the UK with its relatively modest and increasingly flat pension system is also not that much affected by shocks. The Hungarian system is the one that appears least resilient. By contrast the French system appears to be one of the systems which would gain the most if working lives rise, with each additional year cutting the required increase in contribution rates by nearly one percentage point. The analysis in this research reinforces the increasingly standard policy recommendation that the best response to rising longevity is raising the pension age, rather than tampering with benefit levels or raising tax rates.

In this light, Table C.8 provides a final overview of the reforms and the remaining issues that policymakers in these countries need to address. In some countries, e.g. Hungary, the crucial first step is to address the financial sustainability of the system. In others, e.g. Poland, the emphasis is on providing better safety nets, particularly for women. In others, e.g. France, the vital thing is that policymakers ensure employment grows as expected or, e.g. in the UK and Italy, that they entrench for the long-term the principles introduced by recent reforms.

Table C.8 Overview of the reforms and remaining issues

	System aims	*System constraints*	*Policy options*
Austria	Generosity cut but system remains quite adequate and gender outcomes more equal; those on high incomes require private saving to achieve previous income smoothing.	Reformed system reduces slightly future pension wealth, but contribution rate still needs to rise.	There may be scope for further reductions in system generosity for high earners but at the same time try to raise labour participation among those aged 50+.
Finland	Achievement of system aims to improve slightly; but very high penalties for periods spent unemployed, minimum pensions relatively low.	Very substantial rise in required contribution rate reflecting the fact that pension wealth to increase at same time that number of pensioners will rise.	Need to extend working lives so that effective retirement age rises; provide a better safety net for those on low incomes and unemployment credits; private saving needs to provide the income smoothing that state system does not allow.
France	Better poverty alleviation because of higher minimum pensions and credits for childcare and unemployment; but drop in previous income smoothing through state alone.	Very strong rise in required contribution rate, with net pension wealth rising notably on account of longevity rise.	Employment rates among the over 50 and women are an issue; raise SPA to induce longer working lives; need to sustain state system with private saving.
Germany	Reform makes system more progressive and makes gender outcomes more equal.	Women set to receive much higher pension wealth, and together with ageing this will raise fiscal cost of the system significantly.	Income smoothing may require more private saving; need to extend working lives beyond age 60.

Table C.8 Overview of the reforms and remaining issues..cont..

	System aims	*System constraints*	*Policy options*
Hungary	Reforms have made a generous system even more generous for those on high incomes while provision for women and those on low incomes seems lacking, particularly in terms of contribution credits.	The pension system faces a very substantial fiscal challenge; while pension wealth remains stable despite state pension age rise.	Make the system more progressive and cut generosity for those on high incomes while redirecting some of the savings to provide better protection for women and those on low incomes; introduce automatic adjustments so that longevity and other shocks do not overburden the system; employment rates among those aged 55+ are very low.
Italy	Reform has decreased generosity substantially and could result in a significant rise in poverty among women; unemployment carries a very heavy price in pension terms.	Pension system quite expensive at present, but reform reduces future rises in contribution rates by decreasing pension wealth very significantly for future pensioners.	Employment rates among the young, those aged 50+ and women are very low and if increased would help address financial cost; adequate income smoothing requires by private saving; provide better protection for unemployment and improve outcomes for those on low incomes, possibly by making system more progressive; make sure automatic adjustments are enforced.

Table C.8 Overview of the reforms and remaining issues..cont..

	System aims	*System constraints*	*Policy options*
Poland	Reform has reduced significantly system's progressiveness and there are serious poverty concerns for women and those on low incomes; very little protection for women with children and the unemployed.	System faces a very substantial fiscal challenge, even though future net pension wealth has been reduced.	Employment rates among the young, those aged 50+ and women are very low and if increased would address part of the financial cost while improving adequacy; lower pension age for women combined with NDC system makes women worse off – SPA for women should rise; need to improve minimum pensions and provide contribution credits – possible finance: cut generosity to those on high incomes.
Slovakia	Reform has reduced significantly system's progressiveness and there are serious poverty concerns for women and those on low incomes, unless labour participation rises in older ages.	Reform has reduced the required increase in contribution rates, but system still faces big rise. Pension wealth cut for future generations, particularly women and those on low incomes.	Increase labour participation among those aged 50+, revisit the extent of cuts made for those on lower incomes – by providing better minimum pensions and/or credits for periods spent unemployed

Table C.8 Overview of the reforms and remaining issues..cont..

	System aims	*System constraints*	*Policy options*
Sweden	Post-reform system aims achievement remains adequate but this is now more dependent on extending working lives, some concern for those dependent on minimum pension – uprated by prices.	Achieves good degree of intergenerational balance; limits fiscal pressure by cutting benefits if people retire at same age.	Continue to support the pension system with an active labour market policy; ensure individuals are aware of the need of working longer, earnings uprate the minimum pension; supplement state system with private saving to achieve better income smoothing.
UK	Improvements in pension alleviation function – particularly among women; state system on its own, however, is just a foundation for adequate retirement provision.	Financial pressure relatively low, on account of rising SPA	Ensure private pensions fulfill income smoothing role; reduce reliance on means-tested benefits – where non take-up could reduce effectiveness of poverty alleviation; ensure SPA policy remains linked to longevity.

The main analytical contribution of the above analysis is the holistic and internally consistent way in which reforms are evaluated. By looking at the various elements together, it is easier to understand the trade-offs which can be exploited and the risks that particular policies may pose. While most literature has focused solely on how best pension systems can face the challenge posed by the ageing transition, this analysis has refocused the discussion on the really central question – what do pension systems achieve and at what cost. Just looking at one part of the phrase – 'at what cost' – is counterintuitive. Rather policymakers need to focus on what realistically systems can achieve, and act in a way as to change individual behaviour so that any changes in public provision are accommodated by private actions.

This analysis has shown that pensioner poverty may once again reemerge as an important issue in some countries where at present its low level does not attract much political attention. Moreover in some cases, such in Eastern European countries, moves to link benefits with contributions may have serious gender equality implications. Policymakers need to be well aware of these risks and take them into account when designing sustainable reforms. Pension reforms of this kind need to be sustained by effective measures to increase labour market participation and to make sure individuals are aware of the new financial incentives/costs embedded in new pension systems. While clearly linking benefits to contributions makes sense to provide an effective and sustainable income smoothing function, policymakers also need to remain aware of the crucial poverty alleviation function of state pensions.

While this analysis has shed some light on these risks, there is scope for much more research. The hypothetical individuals used in this dissertation are an improvement on the standard full-career hypothetical cases, but they still fail to capture the intricacies of the real world. Policymakers would need to look at a wider variety of cases, particularly for different types of broken careers, and model more refined socio-economic differences in labour participation. Another important modelling issue that this research has skirted is household formation and to what extent this makes a difference to the social sustainability indicators. For instance, no assessment was made of whether women's position would be better in some countries if one were to consider entitlement to their partners' pension. Similarly no attempt was made to allow non take-up of minimum pensions, or consider their interaction with private saving. Private provision was also assumed non-existent and this is a major simplification, particularly for some countries, notably the UK. Current provision and expected developments in this field have very important implications for the social sustainability of state pension systems.

Despite these very important analytical considerations, the social sustainability framework developed in this research has enabled us to arrive at an improved understanding of whether the reforms conducted in Europe during the last decade will prove to be sustainable. It confirmed that in many cases, there remains more to be done to address the financial requirements brought by the rapid ageing of Europe's population. It showed that when pressed, policymakers, particularly in Western Europe, were more willing to sacrifice the income smoothing function of pensions rather than poverty alleviation. This is a decision that makes considerable sense as middle- to high-income individuals are possibly in a better position to accommodate the effect of state pension reforms by increasing their private saving.

In this regard, in view of the need to potentially decrease in absolute size the net pension wealth of future generations, policymakers should consider further increases in state pension ages, complemented with an improvement in the labour market participation of older working age individuals. By maintaining the proportion of life spent in retirement unchanged across generations, policymakers would be better able to achieve similar system aims as under current systems. This would minimise the required increase in future financing requirements. At the same time, this analysis suggests that in some cases, notably in Eastern Europe, policymakers may not have fully considered the full impact of their policies on those on low incomes, on those with incomplete careers and on women. Having a state pension which is able to alleviate poverty and provide a solid foundation for individuals to pursue their desired level of consumption smoothing will become even more important as the ageing transition progresses.

If tackled in a socially sustainable way, pension reform need not be as tortuous a process as it has been over the last decades. If policymakers agree on the aims they want their pension systems to achieve, and have the good sense to get political acceptance or at least make sure citizens are well informed of these aims, they will be able to set in place reforms that stand the test of time. The framework developed in this research presents one way in which policymakers can determine how best to structure their reforms. It shows the interaction between the achievement of system goals and pressure on system constraints, and is able to shed light on the effects of reforms on all groups of society. Pension systems have proven to be one of the most treasured social constructs of the twentieth century. There is little reason why they should not remain so also during the twenty-first century, if policymakers make the necessary modifications to assure their social sustainability.

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